Industrial Finishing

Reg. U. S. Pat. Off.

An Independent Publication Devoted to the Finishing of Industrial Products

Vol. V, No. 5 | MARCH, 1929 | $1.00 a Year

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Published by PRACTICAL PUBLICATIONS, INC., 802 Wulsin Bldg., Indianapolis Ind.

Eastern Representative
C. A. Larson
524 West 31st St.
New York
Phone, Penns. 9049

Western Representative
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From the Editor's Window

I BELIEVE the most significant feature about industrial finishing in general is emphasized more strongly in this March 1929 number than any issue heretofore published. It is the broad scope of activities, the immense variety of products and the great number of industries represented.

Among the industries are: aircraft, automotive, fixtures, furniture, radios, novelties, agriculture implements, sea craft, household appliances, sporting goods and many others—every one calling to mind numerous factories producing one or more articles, each of which presents problems of style, design, color, finish, decoration, preservation of the surface, and economical production.

Then there is the immense array of equipment and materials available for every requirement in every industry that uses finishes. A far cry indeed from the days of slow-drying paints and varnishes, when so much labor and time and space were consumed on both the plainly coated and the excessively striped jobs.

Finishing has become a powerful factor in the industrial world. The vast sums of money spent for it have attracted great numbers of firms large and small, and an army of artists, designers, chemists, mechanics, inventors and various kinds of specialists—all eager to serve; all striving to develop improvements in one form or another. As a result of this mass activity, rapid progress is being made in all phases of industrial finishing.

O. H. Rohr

Managing Editor

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To this day—UNCHANGED in basic design since its very introduction over SIX years ago,—maintaining a continuous LEADERSHIP acknowledged by the world's largest and important production industries,—has been the phenomenal and unparalleled record of the former BINKS No. 105 Spray Gun.

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A Fundamental Trend Modern Art!

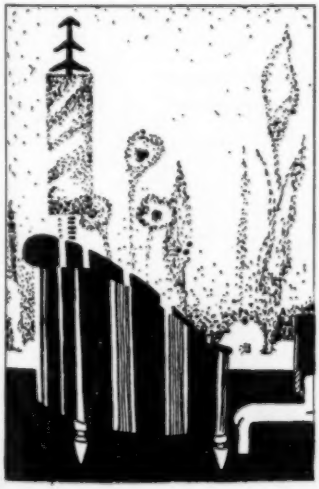
The why, where, when, and how of Art Moderne in design and decorative treatment as applied to latest furniture—explained by an artist, designer, interior decorator

By La Vera Ann Pohl

MANY FURNITURE manufacturers are asking, "What is modern art?" and, "Will this thing called 'modern art' last?"

Modern art is an outgrowth of the present age. Simple lines, and designs, the effect of big things and plenty of space. The motor and machine age with its feeling of speed, ease and new developments—these are some of the expressions that are found in modern art.

Today's motor car carries the modern idea in the body design—a series of luxurious sweeping lines and curves. This idea is reflected in the fabrics and furnishings, and in the lacquers in their varied hues and tones, lovely in their harmonies. Truly, it is a monument in line and design—a monument in ease, service and luxury.



Not a Passing Fad

So it is with modern furniture—large, roomy, built on simple straight lines, sweeping curves, bold and interesting fabrics, lovely colors. If you are one of those who believe that modern art is a passing fancy or fad, watch your step lest these modern curves and straight lines be your stumbling block. Do not turn up your nose at displays of furniture in the new manner, for the days of doubt for the furniture buyer are over; America is accepting modern art.

Great hotels, theaters and office buildings are being designed and equipped in the most modern of modernistic manners. Where big ideas and trends lead, the lesser lights are sure to follow. Modern art is here to stay! We are living in an era of tremendous change, and modernism is a vital force in in these changes. Modern design, based on straight lines and interesting curves, finds no basis of relationship to a bye-gone day of furniture designing. The new design is massive, dignified and bold; often it is daring, but above

all the new design, daring as it may seem, always remains simple.

Fabrics; Carvings; Woods

Fabrics are studies in harmonies of tones; they are made of substantial materials, often bold in pattern—even to the extent of huge stripes and figured patterns.

Formerly a weak line or curve was often covered with one or more carvings so exquisitely exe-

Section of drawers showing wood grain arrangement. Top of dresser, black marble.

cuted as to deceive the eye. Today, however, carvings are largely eliminated, but when they are used they bear a direct relative value to the line or curve involved. The general contour of a piece being simple, it remains but reasonable that any carvings employed should also be of extreme simplicity. There are no roses and floral tributes to a table or chair out of the Victorian era; a line or two to suggest a rose perhaps, but that is all.

The achievement of modern furniture designing is in the great variety of woods employed in its construction and ornamentation. Rare beauty in texture and grain, combinations of unusual color and figure such as we have never seen before—these lend an enchantment to modernism in furniture which will overrule all objections to the very thing called "Art Moderne."

With this extreme variety of woods and wood combinations, the furniture manufacturer today has an opportunity to produce furniture which is not only interesting, but which is of real value—masterpieces in artistry and craftsmanship.

Finish is all Important

Mirror-like surfaces and soft satin finishes are the best types employed in the new mode. An extremely dull finish does not lend itself readily to the modern trend. The object of large surfaces of wood is to reflect other colored objects in the room. Reflection of objects is one of the basic principles of modern designing. Dull finishes do not reflect objects readily and are therefore avoided.

The mirror-like finish gives a depth that is pleasing to the eye; it brings out the beauty of the grain or figure in fine cabinet woods. Every effort should be directed to produce this mirror quality finish. A mere top surface finish can never accomplish this most desirable effect. Great care should be taken by the finishers, for with them rests much of the responsibility for the attractiveness of a particular line of goods.

Manufacturers of upholstered furniture can bring out combinations the beauty of which will be

remarkable, if they will use their fabrics as a basis for the toning of wooden parts employed. A direct feeling of unity should exist between the fabric and the wood. This will involve the use of colored stains in many cases—colors other than the customary browns.

Matching grains, or arranging

involved and interesting patterns so as to bring out effects of design, is a problem that requires study, Much can be done to relieve certain designs or bring forth others by the employment of the white silver or gold line or rib.

Color Wisely Used

Modern furniture is many times gay—even bold—but at no time should modernism resort to garishness. Brilliant reds, oranges,

½ Front Section of Buffet

greens, yellows and blues are not recommended. There is always a direct harmony in tone and value. Colors must blend gracefully, and each color involved must form a partnership with the adjoining colored area. A deep blue on the green side can be blended to a pale green-blue and this, in turn, can be combined with a green-yellow which is also blended to a lemon yellow; both can be combined with silver and black with a touch of persimmon red.

Color is one most important feature of modernism. Grave mistakes are made, however, when color is allowed to become unruly. Every finisher would do well to make an intensive study of all fabrics involved and of the lighting effect upon wood that is not colored, as well as of that which is sprayed with colored materials. The finisher will find an absorbing subject in the new modernistic conception of color—an old field suddenly becomes scintillating with splendor.

The Victorian era and the era of period furniture is spent. A new day is now upon us. With Europe and New York in the background; with the world's most capable architects, interior decorators, furniture designers and fabric creators eager to carry on in this new movement, it becomes more than a style. It is fundamentally a new approved form of design, a great versatile mold in which our buildings, automobiles, furniture and other articles are cast. Modernism will last because it belongs to an advanced age.

Modernistic art is but a new salesman. The finishing department can either make him a winner or give him the appearance of suffering with acute gastritis.

Sells Byrnes Shellac In Virginia and Carolinas

James W. Byrnes Shellac Co., Inc., 162 Front St., New York City (importer and manufacturer of bleached shellac varnish) is now represented in Virginia, North Carolina and South Carolinia by Mr. E. G. Strieter, Wiltshire Boulevard, High Point, N. C., where a quantity of material is carried in stock.

Changes in DuPont Personnel

The following changes in the sales organization of the Paint & Varnish Division of the E. I. DuPont de Nemours & Co., have been announced: J. C. Halloway, formerly supervisor in the Virginia-North Carolina district, has been promoted to the position of assistant to the sales manager at the division office at Philadelphia.

R. J. Lewis, who has been a senior salesman in the Baltimore district for several years, has been advanced to the supervisorship which Mr. Halloway relinquished.

In the Chicago district of the Paint & Varnish Division of the DuPont Co., H. R. LaTowsky has been appointed supervisor of the states of Michigan and Indiana. Mr. LaTowsky was formerly sales promotion manager of the Chicago district.

"The writer believes himself to be one of a multitude who have patiently and hopefully sought some tangible information as to a definite schedule of air pressures for use in the paint shop on various finishing materials."

Geo. E. Heron

WHAT SPRAY PRESSURE? STANDARDIZATION!

Standardization of finishing materials as to viscosity, consistency and specific gravity would permit the establishment of fairly accurate standards in regard to what spray pressure to use for best results

By Geo. E. Heron

THE OPINIONS stated herein are not merely personal conjectures—but the result of several years experimenting and questioning of paint manufacturers (both their experimental laboratories and sales representatives) practical finishers, spray equipment companies and others interested in creating some semblance of a system of order in this chaotic phase of industrial finishing.

At present, I am frank and ready to admit that I have no proven policy to offer for the correction of this condition, but I do believe that the present condition can be improved to a valuable large extent.

Standardization of Materials

Is it not possible to arouse interest and have a concerted effort evidenced in regard to the spray equipment and paint manufacturers, so that fairly accurate and authentic reports can be collected on "pressure for application," and then have this information passed on for use in the finishing trade? By this is meant the decision on some definite standards for viscosity, consistency and specific gravity for various materials, and from these evolve fairly approximate efficient pressures to use in applying these materials with the greatest speed, least loss and best results.

Two undeniable facts are at hand:

First—spray methods can be made more efficient.

Second—at present, the highest point of efficiency is such a variable one—when using like ma-

3 ways this sanding sealer *saves* MONEY

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No slaves to custom, potent Thonet Bros., Inc. measures facts sternly...accurately, and uses them

Fact-measurer GERACI

Fact-user WINTER

1. This Sanding Sealer sells at a lower price than good shellac. Of course you can buy substitute shellacs or film scrap lacquer sealers for less money than the price of Zapon Sanding Sealer No. 1038. But what good craftsman would think of ruining his reputation by using "sure ruin," cheap materials.

Sanding Sealer No. 1038 is a good quality, genuine pyroxylin lacquer. The reasons why it sells at such a low price are: 1, because we can make it on a mass production scale; 2, because we want a big volume of business. The first reason is explained by the fact that this product can be used on all types and grades of furniture. It is not like a finish coat lacquer which must be produced in limited quantities due to special requirements for gloss, body, color, etc. The second reason is a frank statement of fact.

Padding Zapon 1038

2. It's easy to see how this way saves money in production. A time record will show that Zapon Sanding Sealer No. 1038 dries in one third the time of shellac and *can be sanded in one half the time.* The last means a big saving.

The substantial body of Sanding Sealer No. 1038 assures perfect filling. Its adhesion is good. It offers a perfect base for varnish or lacquer.

Read how Mr. Geraci, Efficiency Expert, and Mr. Winter, Factory Superintendent, of Thonet Bros., the largest bentwood chair manufacturers in the world, find out and use facts.

3. They tested Zapon Sanding Sealer No. 1038 thoroughly in production—and discovered a new use for it. They found that Sanding Sealer No. 1038 pads *easier* and *better* than shellac. Easier because it flows under the pad and fills without trapping air; better because it flows on more uniformly; and since it sands easier, there is no danger of cutting through and rubbing through the stain.

The pad is made of tightly rolled, washed cheesecloth. It should be about 1¼" thick and 7" long. The sealer is placed in a Mason jar to prevent evaporation. This sealer is padded by using the forward stroke only.

Send in for a free generous sample which will be shipped promptly from our nearest branch office. The coupon saves time and will save you money.

No slaves to custom, Thonet Brothers Inc. measures facts sternly, accurately—and uses them. Several hundred foremen finishers have tested — measured — and are using Zapon Sanding Sealer No. 1038—to good advantage.

THE ZAPON CO., Stamford, Conn.
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terials made by different manufacturers—that until some method of standardization is used, the first fact will not be universally possible.

Is there any need for a group of varnishes to vary as much as they do in viscosity, consistency and specific gravity, when the group is to be used for the same or similar operations? No! How about enamels, flats, stains, lacquers, etc.? Again I say emphatically, No!

Would it not be worth while to the trade, in passing along ideas and methods used, if some standardization were followed? And would it not help in surmounting some of the inevitable obstacles that sooner or later confront every industrial finisher? I say absolutely, YES!

Would Benefit Finish Users

Though a standardization between paint manufacturers of their products, with their standard spraying pressures, would be a solution to many of the present-day finishing ills, it seems too much to even hope for. But that each manufacturer should set a standard for each of his products for case goods, metal goods, etc., is certainly not too much to hope for.

Automobile refinishing demands careful and skillful handling of the spray gun.

It is a duty rightfully devolving upon every manufacturer to so mark his products, and is one very practical way in which manufacturers can save finishers' time and money which now is wasted in experimentation to discover the pressure at which the best results in appearance can be obtained with the minimum of time and materials.

May this article be the means of kindling the smouldering wish of sharers of the same opinions, and the cause of a flood of letters to the Editor of INDUSTRIAL FINISHING, asking that he call them to the attention of those who might bring about a standardization of materials and air pressures. Until such a "state of affairs" arrives, the following may be of interest to the users of spray-painting equipment:

What Spray Pressure

In regard to a system of standard pressures for applying various finishes, experience has proved that it is practically impossible to arrive at any set spraying pressure for spraying the numerous different materials. Like materials, made by different manufacturers, vary in consistency, viscosity, and specific gravity; one may be easy to atomize and the other difficult. The atomizing pressure is entirely dependent upon the flow of material to the spray gun, speed of the operator and the quality of work demanded.

When using pressure feed, which is the feed in almost common use today, determine the fluid pressure in this way: Regulate the fluid pressure by means of the regulator on the paint tank. Turning the regulator screw to the right raises the pressure on the fluid. The correct pressure

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of the fluid varies according to the height at which the operator is working above the level of the paint tank, and the weight of the paint.

In adjusting pressure on paint, hold spray gun at working height, pull trigger and raise pressure until paint flows *slowly* from the nozzle. In doing this, allow time for the paint to flow through and fill the hose. If pressure on paint is too high, paint will flow from the nozzle too fast for the air to break it up, and runs or sags will result.

Use Test Panels

To determine proper atomizing pressure it is recommended that the finisher spray several panels, using different pressures, and study the results. If a rubbing operation is to follow the spray operation, these panels should be rubbed, and the rubbing time of the various samples should be studied. It may also be necessary to try various consistencies of the finishing materials at the various air pressures before arriving at anything definite.

There are so many unknown factors today in the manufacturers' products that it is impossible to lay down a set rule for procedure in every case. If the operator or finishing foreman has just the ordinary knowledge of painting, and if he uses good judgment, no disastrous difficulties should be experienced. Vigilant and thorough checking up of methods and the data covering results of materials is advised, as frequently as any change of materials takes place, since I have noticed changes in the reorders of materials obtained from identical sources.

We must learn to insure our own prosperity.

Dye Solution for Lacquer

It might be of interest to note how dyes are made up and incorporated in modern lacquers. Two types of dyes are used in lacquer work, namely, spirit dyes and oil dyes. The spirit dyes are usually at their best when dissolved in straight alcohol. However, more strength is often obtained when these are dissolved in a mixture of about 40 percent of butyl acetate and 60 percent of wood alcohol. When so dissolved, there is very seldom any difficulty of incorporating the dye solution with the lacquer.

In the case of oil dyes, I have found through experience that these are easily handled when dissolved in 40 percent of butyl acetate and 60 percent of toluol, and no difficulty should be experienced with these solutions. Usually 10-oz. of dye per gallon of either of the above solutions will give all the strength desired.

These solutions may appear to be high in price on account of using butyl acetate, but when strength and ease of working them is taken into consideration, they become very reasonable.—L. B. Miller.

Color, becoming more prominent in our lives each day, certainly has elevated the finishing department. Who has heard of the "paint room" lately?

Japan Will Clean Up and Paint Up

Kaoru Fukui, representative of the Nippon Paint Co., Ltd., Tokyo, Japan, visited the new headquarters of the National Clean Up and Paint Up Campaign Bureau, 310 East 45th St., recently and purchased a full line of Clean Up and Paint Up display material for shipment to Japan. Mr. Fukui plans to bring about the inauguration of the Campaign in Japan on the official plan of the National Clean Up and Paint Up Campaign Bureau.

DECORATIVE FINISHING

Decorative finishing of the highest order—where price is no object and no two jobs are alike—includes spray finishing supplemented by skillful hand brush work by trained artists

By D. A. Hampson

THE LAY PUBLIC is fully sold on the desirability of hand work, whether it be a piece of lace or a painting. Many products are sold as "genuine hand made" or "hand decorated" when the only approach they actually bear to the hand work class comes through being loaded on and off conveyors by hand, or through the human aid needed to place the individual parts in a machine.

A similar picture might be painted of decorative designs which are known in the retail trade as "hand painted." Often, the salesman doesn't know the difference between a stencil or a transfer, and a really hand painted figure; he doesn't mean to misrepresent, he has been told that so-and-so was hand painted, and he knows that the customer waits open-mouthed for something of the sort.

Furniture and Furnishings

An unusually large amount of hand decoration goes into the products of the Orsenigo Co., Inc., plant in Long Island City. This firm makes furniture reproductions of the highest class and complete interior decorating schemes. The Company's New York City showrooms occupy nearly half a block, where both suites and individual rooms are finished and furnished according to periods and modes. Besides this, loose pieces in profusion are exhibited.

Hand decorations play a very striking part in the finish of this vast display. Whether the decorations are of stern old English or the more flashy French, or the dull gold of Italian, that which attracts the eye is put on with brush wielded solely by the artist's sk!".

No transfers or stencils are found on these products. Nevertheless, modern methods are employed throughout the plant, as far as practicable, but nothing has been found yet to usurp the place of the hand artists. Thus, a battery of spray booths and guns of the latest type is found along one side of the big room, but beyond this the substitution of power for the hand brush ceases.

One end of the floor is given over entirely to a corps of decorators some of whom appear in the illustration accompanying this article. A space that may be expanded from 1000 to 2000-sq.ft. is available for this work, in accordance with the bulkiness of the product at any particular time. North light may be supplemented by south if desired.

Native Artists

Artists who have specialized upon work peculiar to Old World designs, find their talents fully utilized on work in process. In most cases, the work on French, for example, is done by a Frenchman, for only he can fully appreciate what the art of his country demands in the way of faithful reproduction. The same is true of the Italian, and the Spanish—and the newer demand for Japanese decorations is met once again by the skill of a native son.

One reason for the relatively large corps of artists is the special nature of the output. Nothing is made for stock. The interior of an ocean greyhound will be entirely different, in scheme, from the newest mansion of the wealthy.

The work from Orsenigo's finishing departments is marketed from Kansas City and on the Pacific Coast, as well as from New York, and is proof that individual skill is still largely in demand.

Improved Lacquers Varnishes and Enamels

At the present time we are in a finishing era wherein quick results are demanded; this means that certain types of rapid-drying finishing materials must be used, such as lacquers, four-hour varnishes and enamels.

These types of materials certainly would have been a blessing in disguise a few years ago, when the writer of this article was working in the finishing room of a certain furniture factory, where finishers had to work into the wee small hours of the morning on rush orders to be shipped the following day; where goods were often shipped with the finish still soft—resulting in the customers receiving b a d l y marred and printed furniture. What a help lacquer would have been in those days!

Some remarkable progress has been made in improving this nitrocellulose type of lacquer finishing material, and the progress continues.

Now we have four-hour varnishes and four-hour enamels which, I believe have great advantages over the old types of varnishes and enamels. Some of these new materials dry very rapidly and have remarkable durability, while others do not dry so quickly. There is still plenty of room for improving these materials, and as time passes on they will be improved; thus we see now a realization of the old-time finisher's dream of quick airdrying, durable finishes.—Joseph Cowan.

"My great problem is making the 'Rose Beige' applied to our hoods, match the body. The same manufacturer's "batch number" of lacquer is used in each case (though the body is painted in a branch factory of this company), and all operations are carried through religiously in an effort to avoid this difficulty.

"Some days when shipped out and assembled they are pronounced 'okeh' with a good match; the following day perhaps, they appear several tones lighter, notwithstanding the fact that we are still using the same material as the other fellow. These off-color jobs appear to me to have no relative color to the rest of the job—an absence of color if you care to call it that.

"Personally I have checked back on everything likely to cause trouble, from the stockroom—there taking a 'reading'—right up to the finishing room, and yet I have made only slight progress.

"All material in use is continuously under agitation, keeping the pigments in suspension; in fact every little detail has been checked over and nothing I know of has been left in doubt.

*"Kindly advise me soon, if possible, as I am anxious to get this job swinging the right way."—W. B.**

Motor Car Lacquering Off-Color Troubles

Answering the above inquiry, the author suggests a number of causes and practical remedies for the off-color trouble when hoods and bodies are finished in different plants

By Philip A. Patterson

THE DIFFICULTY in matching rose beige lacquer on automobile hoods and bodies may be due to several causes as mentioned here but, according to Mr. B.'s account of his particular problem, I would say as first guess that the "fading action or absence of color" mentioned is due to some pigment in the lacquer which shows poor light or moisture stability. Many organic pigments and lakes possess this undesirable property, which is magnified or much more noticeable when a very small proportion of such pigment is combined or mixed with a large proportion of white pigment, as would likely be the case in producing such a color as rose beige.

However, a combination of light and heavy pigments or "floating" pigments, used in producing a colored lacquer, could separate after the lacquer film is sprayed if heavy wet coats are applied. The smaller heavier pigment particles sink to the bottom of the wet lacquer film, leaving the lighter white pigment in excess at the top of the dried lacquer film.

For this reason it may be a good idea to check the drying time of lacquer after application to body and to hood, taking into consideration any differences of: (1) film thickness, (2) air pressure used, (3) sprayed lacquer viscosity, (4) type of gun used, and (5) distance of gun from work at both the body and hood-finishing shops.

*Foreman finisher in large automobile body factory.

Measured Lacquer

When lacquer is ready to be sprayed, the viscosity should be taken in a viscosity cup or simple bubble tube and compared to a standard sample taken at the same temperature. The hydrometer method does not measure resistance to flow; it only gives an indication of weight of lacquer used, which has nothing to do with its appearance after the film is dried or after the application of same. I believe that someone describes in detail, in some past number of this magazine, the operation of simple bubble tube viscosimeter.*

Although Mr. B. doesn't state it in his letter, I assume that his company is dipping the hoods in primer, baking such primer, and then applying lacquer direct. The bodies, however, are primed, baked and then receive a required number of surfacer coats which are baked, then sanded down, and lacquer finishing coats applied. From Mr. B.'s letter it can be taken for granted that at no time is the thinned lacquer allowed to remain unagitated, that the spray pots are cleaned frequently and thoroughly, and that his air pressure is uniform from day to day. A varying or fluctuating air pressure can cause an uneven distribution of pigment particles of different shapes and density, as are at times used in some lacquers, especially in tints.

Run Test Panels

In any event my advice is that Mr. B. secure representative samples of rose beige lacquer and of each undercoater, including all priming and surfacing materials as used on both the hoods and bodies. Then secure and *clean* a few small panels of regular body metal (4x12-in. is a convenient panel size) and spray at least *two double* coats of rose beige lacquer on the panels prepared in the following manner:

Panel No. 1—Bare metal panel carefully cleaned.

Panel No. 2—Panel dipped or coated in regular way in hood primer and baked or prepared the same as hoods.

Panel No. 3—Panel coated with body primer only and baked or treated the same as a regular primed body.

Panel No. 4—Panel coated with body surfacer only (no primer), baked and sanded or treated the same as a regular surfaced body.

Panel No. 5—Panel to be built up in primer, baked, surfaced, sanded or finished in the same manner as the company's bodies are treated.

Mr. B. could probably obtain the co-operation of the body-shop foreman in placing these small prepared panels inside regular marked bodies going into the baking oven, so that the panels would be representative and receive the same bake as the bodies. Meanwhile the Panel No. 2 could be treated fully at Mr. B.'s end, and also Panel No. 1.

After the application of rose beige lacquer to the panels and after allowing them to air dry in a darkened room for at least an hour, then compare each panel with Panel No. 1 in order to ascertain if there is any "bleeding" of material from any of the undercoating materials as used, or from any combination of undercoats. In case negative results are obtained in this test, a further test to determine "fading" should be made in the following manner:

*Perhaps it's W. H. Martindale's article, "Measurement of Finishing Materials by Hydrometer," Feb. 1928, pages 76, 78, 80, 82 and 84.

It's a job for a Samson!

In some businesses a man can be his own "stock in trade." His own initiative and ability suffice. He has no need for resources and capital.

But not so with the manufacturer of lacquer. That's a job for a Samson—for Sherwin-Williams, the "Samson" of the finishing industry.

Lacquer is so new—is developing so fast—calls for so much scientific knowledge and industrial development to produce it, that only an old and perfectly organized firm like Sherwin-Williams can cope with its progress.

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The Fading Test

Cover a portion of each panel by clipping on a small panel (by means of paper clips), and expose all of the panels outside at the same time on a sunny or humid day. Compare the exposed and shielded sections of each panel at the end of 15 minutes, 30 minutes, one hour, and each two hours or more thereafter as convenient. This test will show the presence of any light or moisture-sensitive pigment in the lacquer.

Perhaps a fading action followed by a darkening and then a fading action, which diminishes as time goes on, will be observed in the dry lacquer film until the pigment reaches a stable state. Some sensitive pigments never reach a stable condition and a high relative humidity aggravates their tendency to change color.

If this last test shows bad fading of lacquer on bare metal Panel No. 1, then Mr. B. has ample evidence to give the lacquer manufacturer a nice problem to solve. In case positive results are so obtained it would be well to run a check test, using a different batch of rose beige lacquer for an indication that the defect is consistent in all batches of such material.

Batch Variation

It must be realized by all lacquer consumers that there exists a greater or less batch variation in the same lacquer or same lacquer enamel, due to different lots of raw materials being used in their manufacture. This condition is extremely difficult to control on large scale lacquer enamel production. For this reason I would recommend that either the lacquer manufacturer or consumer divide each specific batch of rose beige in such a manner that the hood and body shops may be enabled to use this same batch on corresponding bodies and hoods. This is not impractical and should go a long way toward overcoming "batch variation," as is indicated in this instance.

Other Possible Causes

I believe there is a possibility that the fading, as described by Mr. B., may be only temporary, and after a few days the hoods and bodies will more nearly approach the same color, due to color stabilization in film. There are a few "leads" which are rare but always present possibilities in combating the condition at hand, so I will mention them here.

Sometimes the heat from an engine under the hood will cause quite stable pigments to change in color. Also, the surfacer coats have been known to exert an absorptive effect on lacquers, causing them to dry down more quickly and flow less freely than when the same lacquer is applied over a hard, thin coat of primer. Such a condition would allow "separation" of heavier-colored pigment by allowing it to settle to the bottom of the lacquer film, where wet or heavy lacquer coats are applied over hard, thin and smooth primer coats. Such a condition would account for the absence of color described by Mr. B.

Technical Features

It may be well to call to the lacquer manufacturer's attention the following possibilities for overcoming trouble of this nature:

1—Elimination of non-uniform or poorly-processed organic pigments which are "light sensitive;" insist on the use of more stable earth pigments.

2—The possibility of avoiding

(Continued on page 94)

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Color and Bronze Lacquer over Wrinkle Finish

Superintendent of finishing in large radio factory calls attention to characteristics of new wrinkle finish being used on metal cases, and explains in detail the use of colored lacquers and bronzing lacquers to give an added decorative effect

By Joseph F. Schmoegner

IN A RECENT issue* of INDUSTRIAL FINISHING, I endeavored to give a detailed description of how to finish metal radio cabinets in the new wrinkle finish. In the present article I will try to point out how to make this finish still more attractive by spraying colored lacquer over its surface.

The wrinkle coat itself will display a multitude of angles and surfaces, and therefore will reflect a lacquer coat in various shades similar to changeable silk fabrics. Just what color of lacquer to use is a matter of taste. A very dark brown or green perhaps will appeal to the majority because it is more of a conservative shade. However, lighter shades of greens, tans or grayish blues will change some articles to unexpected beauty. If surfaces are stamped in panel effect a two-toned combination works out very well; and often beautiful effects are accomplished if two contrasting colors are selected.

Added Color Effects

While colored lacquers alone will serve the purpose well, still more attractive effects can be obtained with certain light or medium-light colored lacquers in combination with a small amount of bright bronze powder. This gives a glittering metallic coating. A medium bronze green lacquer, in combination with bronze powder will give an imitation of antique bronze.

Tan, plus a small amount of bronze powder, will result in a very soft tone of imitation gold. Dark shades work well in combination with bright colored aluminum bronze powders. The different hues that can be produced in connection with bronze powders are unlimited, and it is a matter of individual taste to decide on what to use for a particular article.

While opaque colors in combination with bronze powders are far more attractive than plain colors, I must caution finishers—especially if they contemplate using pastel shades—about the weak points of these materials, particularly as to matching.

However, do not misunderstand me! These finishes will not give trouble of any account to the experienced finisher. The introduction of gold-colored bronze will give additional coloring matter in the original base color, although it will not incorporate with the pigmented color, but will float

*Nov. issue pages 105, 106, 108, 110.

individually. Its distribution means either failure or success. Agitating the material by mechanical action is very important, not only in the mixing tanks but in the spray containers as well. Different sprayers may get different shades if some neglect to properly agitate their materials.

Mixing Bronze Powders

Bronze powder, being heavier than pigments ground in lacquer, will rapidly settle to the bottom of the mixing can, and it is only by means of a continuous mechanical agitation that we can keep bronze powder in suspension. The propellers of the agitator should be so designed that they will *lift* the mixture from the bottom upwards.

Tests of lacquers and thinners should be made to discover what particular thinners and lacquers will keep bronze powders in suspension. As incredible as it may seem, I have found that some thinners will keep bronze powders in suspension five to ten times longer than other thinners. The same thing applies to clear and colored lacquers.

Another vital point to bear in mind is that a bright bronze powder will readily oxidize in solution, and it is very important to avoid mixing more material than can be used in one day. Any left-over-night material should never be used the following day (for finishing surface that must match others in color) as it will result in a decided change in color. If it so happens that some material is left, it can be readily used for finishing the insides of cabinets.

A third important factor is to decide upon the number of lacquer coats to use. While it is possible to cover a wrinkle finish with one coat of dark lacquer and produce satisfactory results, we cannot expect the same covering qualities when using a light colored lacquer. Two coats properly applied should give a faultless job, but care must be exercised to apply both coats as uniformly as possible. Best results are obtained when the spray operator sprays lightly up and down and finishes horizontally. Flooding the surface with lacquer will only bring about a tendency for the lacquer to run off the raised points of the wrinkle surface and expose the undercoat.

Maintaining Uniform Color

A light or dry coat will build up a coating from the beginning, and naturally the following coat is bound to cover solid. Once the spray operator has acquired the knack of spraying lacquer over a wrinkle coat, he should have no trouble getting uniform results; but I must remind readers that spraying over previously lacquered articles will produce a different tone. The reason is obvious; it is on account of the additional bronze applied on the surface that is resprayed.

To illustrate this point, suppose we take five gallons of colored lacquer and mix into this 9-oz. of bright gold bronze. With this mixture we spray 20 cabinets, and of this number eight are defective and we are obliged to spray them again. If we happen to make this mistake, we will involuntarily introduce double the amount of gold bronze onto the surface, and consequently we may be puzzled as to why the resprayed cabinets do not match the others. The only way to salvage these defective cabinets is to respray them in a dark shade.

If the foreman finisher wants to

keep the bronze color uniform, he must decide on the number of lacquer coats he intends to apply and then strictly adhere to the schedule, and never respray defective work unless it is with a considerably darker shade.

Another precaution is to check up each drum of light colored lacquer as to its exact tint or tone. It may happen that some drums of lacquers are off color, although this is a rare occurrence. A small metal plate should be sprayed with the original color (no bronze powder), dated and numbered according to the relative number of the drum. This is one method of safeguarding against any error the lacquer manufacturer may happen to make. The same rule applies to the gold bronze powder. While it is difficult to judge bronze powder in its dry condition, any slight difference in color can be detected with comparative ease when it is mixed with bronzing liquid and applied to a surface.

To Prevent Blushing

The above rules apply to normal weather conditions, that is when the blushing of lacquer is not troublesome. Blushing is one of the most expensive drawbacks in lacquer application. There are a few very good methods by which the finisher can keep blushing down to a minimum—provided he and his firm are considerate enough to realize that the initial expense of these preventative measures are justified and afford a real economy in the long run.

Every foreman finisher should have both wet and dry thermometers, and he should make it a practice to take readings regularly. Normal indoor humidity should be 65 percent. At this point, unless the temperature is near freezing, there is no danger of blushing. In fact a fluctuation between 50 and 80 percent of moisture under normal temperature should never give any trouble. If a temperature of 70-deg. F. could be maintained, one could almost have a humidity reading of 81 percent and still have dew point six degrees below temperature, in which case there would probably be no blushing—unless sprayed articles were exposed to a heavy draft.

Room Temperature; Humidity

Maintaining a uniform temperature at a normal humidity would be the logical solution of blushing trouble, but it is not always practical or possible to do so. The next remedy would be a drying room, where articles to be sprayed are stored and replaced after spraying. While this method requires an additional room, it is worth its cost and should pay for itself in short order.

Where first-coated articles are left on the floor overnight, it often happens that moisture precipitates on their surface, and the following morning, even if it be clear, we notice blushing for a short time. If a drying room is available, this condition can be easily overcome by placing all finished articles in the drying room until the moisture evaporates. If no drying room is available, wiping the surface of articles with acetone or alcohol before the lacquer coat is applied, will eliminate blushing, due to the fact that acetone is highly dehydrating, and absorbs moisture on the wrinkle finished surface.

Taking all these precautions into consideration, we should be ready to go ahead with any number of articles to be lacquered and produce a modern finish that will appeal to the majority of customers.

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Which brings us down to our Free Trial Offer. Just send along your name and address. We will send you a quart and a bill. If for any reason Lingerwett isn't all and more than you hoped for, use it all up just the same, and send back the bill. If you're entirely pleased, consider this the first quart of something you will be wanting right along, and pay us for the quart. After that, you can get Lingerwett from your regular source of supply.

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Fixture Finishing in Rakuda Wood

Foreman Finisher relates his experience in finishing a fine lot of store fixtures made of Rakuda—an imported wood—and explains what methods he developed to produce a remarkably attractive and durable finish

By T. R. Nall

RECENTLY ONE of our salesmen submitted a sample of finished wood for my inspection. He asked me to identify it. Immediately I replied, "burl walnut." He told me I was wrong but I insisted that I knew walnut and that this was walnut. Really, I felt sure that it must be a beautifully finished piece of stump walnut. He informed me that he had sold a job that was to be finished according to that panel; that it was a foreign wood known in this country as "rakuda," and that it was imported from Dutch Guiana, South America.

I knew nothing about the wood nor how to finish it, but I felt confident I could match the sample.

Rakuda differs from walnut, although when finished there is a striking resemblance to walnut that is finished light, as for example the French and Huguenot walnut finishes which were so much in vogue a few years ago.

The fixtures and woodwork of rakuda are now installed in a confectionery and tea room in Pittsburgh, Pa. On the day this new store opened, more than 5,000 people visited it and, according to reports, the highly-polished and beautifully-matched woodwork commanded great admiration; it was frequently referred to as an outstanding piece of art. The way the veneers were matched required an artistic eye and skilled workmanship. It was one of the most beautiful jobs ever turned out by our factory.

Rakuda must be finished differently from any other wood that I have ever tried to finish. My only guide was the finished sample, and every practical finisher knows that on a strange wood, a finished sample is of little help in figuring out the preliminary stage.

A Problem In Finishing

First, I filled this rakuda wood with black filler—just the same as though I were finishing stump walnut, but instead of the pores closing up like they do in stump walnut, they turned green! I promptly decided to forget all about walnut and to concentrate my mind upon working out a satisfactory method of finishing rakuda. This is what I did to match the sample. First, I stained the surface with oil stain. The exceptional softness of the wood makes the oil stain preferable, in my estimation, to the water stains which raise the grain and make the surface rough. I used an oil stain made up in the proportion of one part asphaltum (natural finish) stain* to 18 parts of benzine. I let this dry 24 hours and

*For dark walnut finish, I use one part asphaltum stain to five parts of benzine.

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then, filled the surface with medium brown filler. This was allowed to dry 24 hours and then smoothed up with No. 5/0 sandpaper.

Complete Lacquer Finish

For the first coat, instead of shellac I used regular clear lacquer cut half and half with lacquer reducer. Later I will explain why I used lacquer instead of shellac. This coat of lacquer was allowed to dry eight hours; then it was sanded. The second but heavier coat of lacquer was applied and then permitted to dry 12 hours, after which the surface was sanded lightly. A third coat was applied and let dry eight hours, but this coat was not sanded. Then the fourth coat was put on and let dry 24 hours.

We oil-rubbed this final coat to produce that semi-gloss finish; however, if a polish is wanted, the surface can be water rubbed and polished. Both of these finishes are very attractive on rakuda wood in a dull, rubbed or gloss rubbed surface.

This finish that I have just described is almost natural. Using oil stain on this wood will not harm the lacquer coating, because rakuda is very soft and all of the oil penetrates into the wood; if 24 hours is allowed for this stain to dry before the lacquer coating is applied, then the finisher will be perfectly safe.

Lacquer Protects Soft Wood

The reason I prefer lacquer as a first coater instead of shellac is that rakuda wood is very soft and to give it the hardness and durability to compare favorably with other cabinet woods such as walnut or mahogany and to finish up like walnut or mahogany, I believe the lacquer finish is best.

Now I will explain further why I did not use shellac. I have in mind white shellac, although the reader may think I refer to orange shellac since every finisher knows that in some finishes one cannot use orange shellac. But in this one you cannot use either orange or white shellac because either one will turn the rakuda wood finish green. Such was my experience.

This is on the natural finish, of course. In the darker finishes, shellac could be used in very thin coats, but be sure to finish up with lacquer. Rakuda is soft and in a changing atmosphere—with variations in temperature and humidity—it is always taking on and giving off moisture; this alternate shrinkage and swelling of the wood would cause some kinds of finish to crack and "hairline," so you can see my point as to why I prefer to use lacquer from the stain and filler up to the finish coats.

Now I want to explain myself more fully about the sample I matched. This sample the salesman showed to me was of dark walnut finish on rakuda. I matched his sample with asphaltum stain made up in the proportion of one part asphaltum stain and 5 parts benzine; this makes dark walnut. I kept cutting this stain until I got almost a natural finish like the store we finished in Pittsburgh, Pa., and that is the finish I have described in this article.

Editor's Note: "Rakuda" is the trade name of a tropical cabinet wood controlled and imported into the U. S. by the Rakuda Wood Products Co., of Pittsburgh, Pa.

It is a white wood, and in appearance is similar to Primavera or white mahogany. It has the same characteristic stripe and figure as the mahogany and, while

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It sands more easily . . . dries more quickly . . . is more durable . . . and knits perfectly with succeeding Lacquer coats.

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this wood lends itself readily to handsome finishes in any color, it is particularly useful when stained a light golden brown or even finished natural, being the only white wood within a price range, lending itself to lighter finishes.

The crotch is very beautiful, particularly in the light finishes

Radio Cabinets In Striking Chinese Lacquer

Striking colors of Chinese lacquers have been brought into use in the finishing of one of the popular low-priced radio cabinets, the product of a well known radio manufacturer. In using these lacquers of Chinese origin he also has combined with this wealth of color, a Chinese motif of Chippendale era designed by this noted man at a time when he was working under a strong Chinese art influence.

The use of Chinese lacquers of such striking colors as we find in this new cabinet, makes a rather strong appeal to those who appreciate something out of the ordinary in radio cabinet finishes. The three distinct Chinese colors selected are among the most beautiful of all the Chinese lacquers and comprise: Mandarin red, a deep rose vermilion shade; Nanking green, with a depth of softness, suggesting a faded Chinese velvet, and a rich satiny black, which is referred to as Manchu black. Just as the Chinese have long obtained their best results by the use of superior lacquers, the lacquers chosen for these radio cabinets are the finest to be had in the world today.

Great care was given to choosing the metal finishes to harmonize with these lacquers from the land of Confucius, and we find on the Mandarin red set a metal finish of dull gold. The beauty of Nanking green is set off with a cabinet finished in a curious gold finish, while against the background of Manchu black there is used a white gold finish that seems to gleam like a piece of polished pewter. The selection of these striking Chinese colors gives to these sets a distinctive appearance which seems to lift them out of the usual line of radio cabinets. Such is the power of color.—A. J. Owen.

Modern design holds something that is little touched at the present time and which will show development in industrial products in the next few years; it is the relation of color to the design of an article. A motor car with certain lines and giving a certain general effect can be finished in any shade, but the problem of the finisher is to determine the effect desired and then complete the design with a symbolic and suggesting finish.

A Survey of Nitrocellulose Lacquer: New Book

A Survey of Nitrocellulose Lacquer, is the name of a new book of valuable information on nitrocellulose lacquer published by the Chemical Catalog Co., 419 Fourth Ave., New York City. The contents include an introductory chapter "Lacquer Solvents and Diluents" and more than 200 pages of lacquer formulas as revealed in patents obtained in the United States and all foreign countries.

One entire chapter lists the names of published books, bulletins and magazine articles pertaining largely to nitrocellulose lacquer materials, and the use of lacquer; also other indexes of materials named in patents cited, and names of authors of patents and literature mentioned.

The authors are Bruce K. Brown, and Francis M. Crawford. This book contains 368 pages, 6x9-in. and is substantially and attractively bound in cloth. Price $7.50.

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Spray Gun Operation and Maintenance

Why it is so necessary to keep spray guns clean, how to clean them and why the size and style of nozzle is a factor in connection with the proper air pressure to use

By Ben J. Studer

THE first, and what I believe is one of the most important points in spray gun manipulation is to keep the gun clean. This is practically necessary to keep it in proper working condition and to obtain satisfactory results. The gun is apt to become more soiled or gummed up in some kinds of work than in others. For instance, when spraying case goods a piece of cloth moistened with lacquer thinner, should be kept handy to wipe off the nozzle frequently. If the nozzle gets a trifle soiled, it is likely to spray heavy at either the top or bottom. This, really, is the cause of some of the "trouble" that spray operators sometimes complain about.

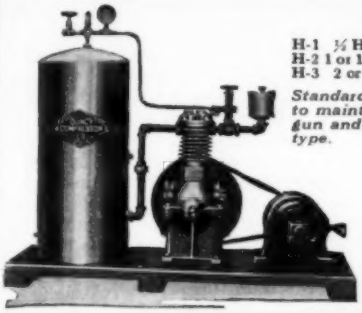
Avoid Soaking in Thinner

To clean their spray guns at the end of the day, many spraymen just drop the gun into lacquer thinner and leave it there overnight. This is injurious to the spray gun. The effect of the thinner by this prolonged "soaking," which frequently amounts to two thirds of each day, is to shorten the useful life of the spray gun. The first evidence of this mistreatment can be recognized when the gun does not spray true. I have been using a well known make of spray gun for 18 months without trouble of any kind.

To properly clean a spray gun, it should be taken apart and each member wiped clean with lacquer thinner. Then oil every part of the gun, re-assemble it, and lay it away in a dry, dust-proof place until it is to be used again. This treatment of the spray gun as a fine tool, will result in its better performance and longer life.

To obtain the best results with a spray gun, the air pressure should be regulated according to the viscosity of the material being sprayed. Some salesmen may declare that you can spray the material he sells, with only 35-lbs. air pressure. I should say that he doesn't know much about spraying conditions if he thinks this is a good sales point, but perhaps he only means enough air to "break" the fluid that is being sprayed.

I wonder if some men take into account the fact that when spraying with a pressure feed, the



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N36

finisher must use enough air at the nozzle to conform with the pressure in the container to get proper results for the size of the spray nozzle. With a No. 24 nozzle of the spray gun I am using, I use about 65-lb. air pressure at the nozzle and about 7-lb. air pressure in the container for spraying the lacquer now in use in our plant.

But all lacquers do not spray alike. The best recommendation I can give as to this is for the finisher to become familiar with all conditions that govern his particular case, and then proceed according to such logical standards as his own good judgment dictates.

Chemical "Snow" Puts Out Fires

Those engaged in the industrial finishing side of industry may well "sit up and take notice" of this newest development in the fire-fighting art, for it is particularly valuable on the kind of fires that are peculiar to this industry.

This "snow" is projected from the end of a nozzle in much the same way that chemicals are, when the familiar soda-and-acid tank is used. With "snow" the flames are both cooled and smothered. The chief aims of all extinguishing agents are these same things, namely, to cool the burning mass below the temperature of combustion, and to exclude the oxygen which is necessary to support combustion.

For oil and chemical fires, the foam type of extinguisher has become very popular. The "snow" extinguisher follows in the same field, but it does not have the range for general purposes that the other does. To make up for this deficiency, however, the "snow" evaporates without leaving the slightest residue; it leaves no water or dampness. Any sort of a fire that burns without an ash is a foe for the "snow" extinguisher to combat.

This unusual substance is not water snow. It is a chemical product. The so called "dry ice" which is being used in modern refrigeration is of the same making. Dry ice is *solidified carbon dioxide*, and the product from these extinguishers is the same thing, but not in compressed form.

With these fire extinguishers, the tank is filled with carbon dioxide gas under pressure. When a valve at the top is opened, the gas escapes through the hose and its nozzle, the latter having the appearance of a funnel about 18-in. long and 2-in. in diameter. By the time the gas leaves the funnel, "snow" is forming. Being white, it is easy for the user to lay a continuous coating over a blazing surface, if need be.

The temperature of the "snow" is slightly more than 100 degrees below zero, from which it may be imagined that its cooling effect is rather pronounced.

A point stands out in marked contrast to acid extinguishers, and some others. These have to be completely emptied and re-filled after being used, even though but a quarter of the contents have been discharged. With carbon dioxide, this is unnecessary; a little may be used at a time, and so on indefinitely until all is gone. There is no deterioration of the contents—A. Ackerman.

Pale blue is interesting as a stripe on black or dark surfaces to relieve the monotony of vermillion, straw, green or gold-bronze stripes, which have been used to the point of diminishing utility.

ARMITAGE S13 Lacquer Sealer

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ARMITAGE 1909 Clear Flat Lacquer

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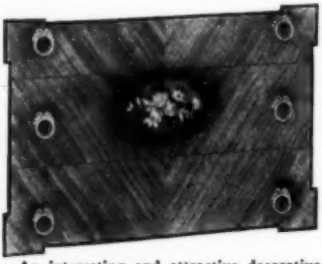
Applying Decalcomania Decorations

Decalcomanias have been developed to such a high degree of perfection that only an expert can tell the difference between these applied transfers and artistic hand painting. Although the application of the transfer is comparatively simple, the work requires considerable practice and skill to avoid spoiling the design occasionally.

There are several ways of applying these transfers; for instance, with varnish, special cement, shellac or japan size. The



An interesting and attractive decorative feature centered in group of three dresser drawer fronts.

secret lies in letting the size dry to a "whistling tack." The size, of course, is applied to the picture side of the transfer. If it becomes too dry it will not stick at all, and if it doesn't get dry enough it will peel off.

After the sizing reaches the proper state of tackiness, the transfer is placed on the article and should be rubbed down with a roller until all blisters (caused by entrapped air) are out, after which the paper must be made wet on top until it will peel off without lifting any of the color. If a small part of the design should come off, the marred place may be fixed by touching it up with a little oil color. After peeling off the paper, the surplus size or gum should be cleaned off with benzine, special cleaner or turpentine.

Some transfers are duplex, or on a double paper. When this kind is used a corner of the extra backing paper should be loosened before the transfer is applied; then, after the transfer has been put on, the top thickness of paper is pulled off, after which the decalcomania is rubbed down, and finally the second paper is removed the same as if the transfer had only a single paper backing.

As a means of protection for the transfer, a coat of shellac cut 50 percent with alcohol, or a coat of varnish, may be applied 12 to 24 hours later.

Since the advent of lacquer, manufacturers using lacquer in their finishing schedule have tried clear lacquer over the transfers and have experienced some trouble in blistering.

After a great deal of experimental work, certain lacquer manufacturers have overcome this difficulty, and now their lacquers can be safely used over these decalcomania transfers.—W. R. Beutin.

New Duco Shades

In order to keep abreast with the popular vogue in colors, three new Duco shades have been added to the paint and varnish line of E. I. Du Pont de Nemours & Co. These new colors are peach, Sahara and wisteria. They were selected by the Du Pont Home Decoration Service in consulation with leading interior decorators to obtain colors, which not only are popular but also correct from the standpoint of art and beauty in home decoration. Among the new effects produced by combinations of the new colors are the following: Wisteria trimmed with Nile green, aluminum, peach or black; Sahara trimmed with coral rose, jade green, Nile green or black; peach trimmed with aluminum, gold, light blue or ivory.

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AIRPLANE FINISHING

Foreman Finisher of Fairchild Aviation Corp., explains some of the metal cleaning, and metal and fabric finishing operations involved in the finishing of modern airplanes

By Dennis O'Brien

THE writer remembers as a boy in a railroad shop, it took 30 days to finish a railroad coach. In those days we started with lead and oil, rough stuff and its subsequent rubbing, straight japan colors and varnish—sometimes four coats of the latter.

Then came the paint manufacturers with their systems, the A.B.C., the 1,2,3, the four coat systems, and so on. They reduced the shop time of a coach from 30 to 15, and then to ten days; and the writer as foreman painter of the Long Island Railroad, reduced it to four days.

A few years ago little attention was paid to the painting of airplanes. There was not enough material used in the entire industry to warrant the large manufacturers of paints and varnishes to engage in the trade. The few pioneers serving the airplane trade, sold dope and lacquer which was applied after a hit or miss fashion. There was no system; dope was applied until the fabric was taut—it might mean four coats or it might mean ten coats.

There was no economy in this method of finishing, and there could be no adequate production. What was needed and what is required at this late date, is a finishing system for doping and painting airplanes.

The wood frame parts, such as wing ribs, should be coated with liquid filler and two coats of spar should be sprayed on, and dope-proof paint applied where surface will come in contact with fabric.

Metal parts of the ship must be free from rust, mill scale, weld scale, and corrosion deposits. Rust is primarily the result of the chemical action of oxygen on metal. That reddish deposit is oxide of iron or ferrous oxide. If this rust is not removed, you can rest assured that the rust will in time destroy the metal.

Metal Fuselage Frame

The fuselage frame, which is steel tubing, should be sandblasted to remove all rust, mill scale or weld scale. If sandblast equipment is not available, a good commercial cleaner or any of the other rust removers mentioned before will suffice.

The sandblast, however, rough-

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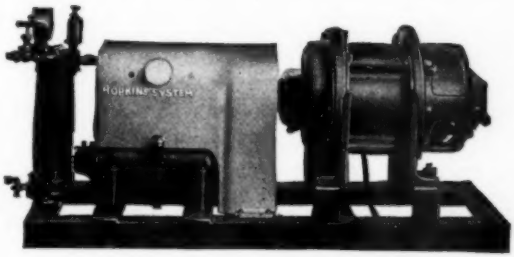

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ens the metal surface—makes small indentures in the metal, and the surface in this condition is receptive for paint. Rough metal is much better than polished metal for painting, as the particles of pigment find lodgement in the indentures and adhere with a tenacity that assures one of a good job.

Rust can also be removed with oxalic acid, acetic acid (vinegar), a 20 per cent solution of muriatic acid or phosphoric acid. In the final, analysis, there must be two operations; applying the rust remover, and washing.

Priming Coat

Immediately after cleaning, the tubing should be painted; a rust inhibitive paint must be used—a good iron oxide or aluminum are excellent paints for this purpose. If aluminum is used (and I prefer it) it should be used with a good spar varnish as a vehicle.

Experience compels the writer to disagree with those who advocate an all pyroxylin lacquer system for metal work. The fact that most pyroxylin base primers possess very little elasticity is sufficient reason I believe, to condemn an all lacquer system.

The ideal system should start with an oil-base primer, the pigment preferably an iron oxide. This pigment should be finely ground so as to insure the surface getting closely pigmented covering.

The primer must possess perfect adhesion, elasticity and be impermeable to moisture and other enemies of metal. The spray method of application is particularly desirable as it insures perfect covering, a smooth job and the coating of all parts that are inaccessible to a brush. The prime coat should be thoroughly sandpapered before the lacquer is applied. The prime coat should stand at least 24 hours before the finisher proceeds with the lacquer coatings.

Applying Lacquer Enamel

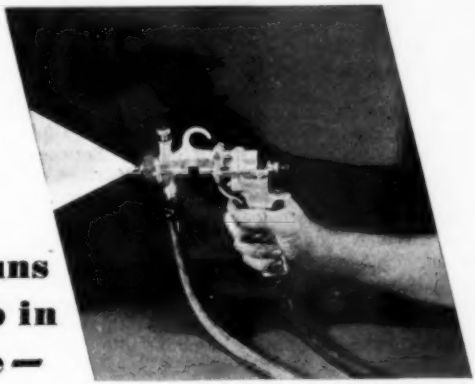
The lacquer used should be the best for the purpose by test, regardless of price. The care and time exercised in the building of a first-class foundation will be wasted if the finishing coats are of an inferior quality. Two coats of lacquer should suffice to produce a solid color; after the second coat dries, the surface can be given a gloss coat.

If the shop is properly heated and ventilated I have found that a mixture composed of one third color (lacquer) one third straight reducer, and one third anti-blush or retarder thinners, makes an excellent gloss. This system, insofar as the metal work is concerned will consume but three days; and surely this ought to afford adequate production basis and an efficient finish.

If the lacquer and gloss coats are applied on the forenoon of the third day, the job can be done in a few hours and left to dry for an hour. The lettering, striping or any of the decorative work can then be finished in the afternoon.

Since many airplanes are custom work, being practically painted to suit the individual buyer, and since the tastes of two men are very seldom alike, the striping and other decorative features are generally applied by hand.

The use of decalcomania transfers are economical and can be used to some extent on airplanes, and the writer believes that the manufacturers of transfer features should watch this business.



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The Fabric Finish

The fabric parts of the ship are doped with clear and pigmented dopes. While dope is not the best article to use, it is the only material available at the present time and, despite its faults, we will have to use it until something better is discovered.

There is a crying need for an efficient and effective system in the airplane field. Surely there is now enough business in this field to cause the paint and dope manufacturers to devote some time in developing a more economical system whereby the number of coats will be reduced.

If we could use an oil and pigment paint on the fabric, our troubles would be over, but unfortunately paint will not make the fabric taut. Dope is cellulose acetate or cellulose nitrate; the thinners are benzol, ethyl acetone, and methyl acetone, diacetone alcohol, benzyl benzoate, methyl ethyl ketone and various other chemicals.

Five coats of clear dope in order to make a smooth job and a receptive one for the finishing coats of pigmented dope—this does not sound good to those who have invested their money in a business that is at present yielding small returns. Basically there is no economy in this and the piling up of coatings will not permit of rapid production. The foundation of the paint and dope job is the most essential factor in the entire finishing plan. If the foundation is faulty the entire superstructure will topple over.

The first two coats of dope are clear and should be brushed on full-body, and not brushed out like paint. There are instances of a third and fourth coat being brushed on; this should not be, as two coats of clear dope should be sufficient to bring about the tautness desired. Of course, a dope that can accomplish the job in two coats, will be a little more expensive in cost per gallon than the four coat dope, but when we figure labor costs plus coverage per gallon we find it cheapest.

Between each coat of dope the surface should be sandpapered lightly. The next coating is pigmented dope, this should be sprayed on, after which a coat of gloss should be applied. This would give the fabric four coats of dope and one coat of gloss and this should be sufficient protection from the evil wrought by the action of actinic rays of sunlight.

Testing Finishes

Every shop should have a test rack, this rack to be placed in the field or on the shop roof. Metal and fabric panels should be made up and paints, lacquers and dopes should be sprayed upon these panels and placed in the rack. Each month the panels should be inspected by the foreman finisher, the condition of each panel should be noted and a record kept of the manufacturer, his material, and its condition. An approved list of manufacturers and their materials would thus be obtained in this manner. It would give an accurate check on the relative merits of different materials.

The manufacturers' representatives should be airplane finishers or laboratory men; at least they should know what they are talking about—something more than just what dopes and lacquers are and their price per gallon. They should know something about shop problems.

The fire hazard in the finishing department can be reduced by cleaning booths, ventilation ducts and floors where waste material accumulates.

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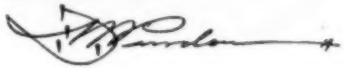

Fillers for Wood Finishing

An experienced foreman finisher explains the composition of wood fillers and tells how to mix and use fillers in such a way as to avoid the numerous wood-finishing troubles that frequently arise

By F. M. Purdon

WOOD filler when not constructed properly—that is the ingredients being out of proper proportions or the filler being constructed with the improper ingredients—has a well known habit of creating no end of trouble to the finish, as well as to all those who are concerned with the finishing process.

Those who are concerned with wood finishing should know when a wood filler is giving satisfactory results, and they should also know all about wood filler when it does not work properly, the trouble it can create and what these troubles may be caused from, so that condemnation will not be unjustly laid to some other material, or finishing process.

This I have seen happen many times: Varnish or lacquer condemned for finishing trouble caused by a poor filler, or a good filler gets the knock for a cheap poor-drying varnish. In order to know just where you stand, you should have as much of this knowledge as either the varnish maker or the filler maker, and why not? You are the man who is responsible for the finish.

No finishing room is strictly immune from this trouble. You may have been fortunate in escaping filler trouble, but it is liable to develop almost any time.

The use of filler dates back well over a century. The early wood fillers were not constructed with the same ingredients of which the fine fillers are made to-day. It required an elimination process covering nearly a century to discover what could be used to make a good wood filler.

Filler Requirements

What is a good wood filler? This is the answer: A good properly-constructed wood filler should air dry clear through from top to bottom of pore in 48 hours, or force dry at not over 110-deg. F., under proper ventilation, in 15 hours. When it is dry it should be hard or tough, so there will be no absorption of the materials placed over it. It should be free

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from shrinkage when dry. It should show no oil pockets; it should pack well into the pores, clean up fairly easy, and should not discolor the wood to any great extent; it should hold its color without bleeding and should not be of such hardness that coating materials used over it cannot get a good footing or hold.

Years ago wood filler was made of such materials as flour, cornstarch, chalk and rottenstone, with almost every conceivable type of binder. On some of the fine old violins, they who have tried to solve the problem in order to produce tone qualities, believe the binder to have been the whites of eggs.

All of the above mentioned materials have one after another been condemned—found wanting as a pigment or base for good filler—therefore each one in turn has been cast aside.

Filler Ingredients

There is no secret as to what the proper ingredients are which should be used to make a good reliable wood filler. These ingredients are *rock quartz silex*, *pure linseed oil*, and a good hard-drying *filler Japan*, together with the necessary coloring materials, the most common of which are burnt and raw umber, burnt and raw sienna, carbon black, Van-Dyke brown, maroon lake, etc.

One other material which is sometimes found as a part of filler is asbestine pulp. This is only used in making filler for shipment. Its principal object is to retain oil and hold the silex in suspension.

Please note that the base ingredients used in filler years ago were of the vegetable class and were not free from decomposition, while the base of filler as made today is a mineral which is free from the action of any solvent or gum used in varnish or lacquer.

What Silex Is

What is Silex? It is nothing more or less than one form of silica, of which there are a great many varieties. Approximately 90 percent of the earth's surface is silica in one form or another, which roughly may be divided into two classes, one a crystalline or hard particle and the other a morphous or soft particle. It is the hard or crystalline silica that is used to manufacture filler, because no matter how finely it is ground it still retains its sharp, jaggered shape which enables it to imbed itself and stay in the pores of the wood.

The quartz for silex is roasted to a red heat and plunged into water; then it is ground under water between large stones in continuously-fed tubs, until it reaches the desired degree of fineness. It is then water floated to separate the large particles from the fine ones, dried and then bolted.

Linseed Oil; Japan Drier

One of the two principal liquids of the binder is linseed oil. This should be a pure linseed oil. The next liquid is japan filler. This is a drier. It does not dry of itself but when used with anything such as a linseed oil, it attracts oxygen like a magnet does steel, then passes it off to the nearest substance which, in this filler, is the linseed oil. It should be a hard drying japan—one that when mixed in proper proportions, will dry the oil in the filler all the way through.

Manufacturers of good fillers are very careful about the amount of Japan used in the filler. If

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too much is used, instead of burning or consuming the vegetable fat of the oil in drying, it will "throw down" or precipitate the vegetable fat, and never dry.

The Mixture of Ingredients

Filler manufacturers also are particular about combining the ingredients which go to make or constitute a good filler. It is important to combine these ingredients in proper proportions and thoroughly mix them into a soft pasty mass.

Following are the proportions recommended: Solids—silex, 85%; asbestine, 15%. Liquids—linseed oil, 60%; filler japan, 40%.

For best results the linseed oil and japan are put into the mixer with the colors (ground in oil), and allowed to run about ten minutes. Then the silex and asbestine are slowly added, allowing the batch to mix thoroughly—45 minutes to one hour—so the ingredients become thoroughly mixed.

If this mixing period is not allowed, the liquids, when drawn off, are apt to remain on top, and a half-mixed product is the result. On the other hand if, the batch is allowed to run too long, there is danger of the mixture becoming rubbery. After the batch is taken off, it should be allowed to stand at least six hours. Silex should be stored where it will not collect dampness, as dry silex is of vital importance to a good filler.

My recommendation is that the filler, now in heavy paste form, should be thinned down with P. & V. M. naphtha to the proper working body, when the finisher prepares it for use. The proportions for thinning this paste filler are about 12 to 14-lbs. of paste filler to one gallon of naphtha.

The wood surface to be filled should be free from the dust, which generally accompanies it from the cabinet department, or the dust which remains from sanding the size coat of shellac, in case the surface has been water stained. A good plan is to have an air line with which the surfaces may be air dusted. This dust, if allowed to remain in the pores, becomes a source of pin-hole trouble, and shrinkage in the finish later on.

The filler should be well stirred and applied to the surfaces with large flat brush. For good filling, do not be afraid to brush the filler plenty during its application, as this helps work the filler into the pores while it is wet. When the filler has "flattened" it is ready to wipe up. First it should be well padded into the pores of the wood with a burlap pad, using a circular motion over the surface.

When this padding has been done properly and the pores show they are well filled, the surface should be cleaned up across the grain with clean rags. All of the corners and edges should be well cleaned with a corn broom brush or wooden pick. There should be no filler left, except that which is in the pores.

Filler Troubles

One common fault found with wood filler which is made improperly or adulterated with cheap oil or japan, etc., is that it does not dry clear through; it causes absorption of subsequent coating materials, also retarding the drying of these coating materials. A filler that is not dry is easily attacked by the solvents of lacquer, which results in bleeding and causes gray pores in the finished work.

Absorption or shrinkage of coating material, and the presence of gray pores, may also be caused

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by a filler which is "short on oil" or lacks the proper amount of oil for a binder.

Gray Pores

While I am on the subject of gray pores, it may be well to call attention to another cause from which gray pores are produced, which is often blamed on the filler or lacquer. A wood surface that is water stained is or should be followed with a coat of thin shellac, commonly called as a "size coat."

If the water stain coat is not thoroughly dry when the size coat of shellac is applied, and if you are finishing with lacquer, you will have gray pores, as this moisture does not allow the filler to dry in the bottoms of pores; the filler remains in a condition subject to attack by the lacquer solvents.

Many finishers complain of gray pores in humid weather, while at other times, when air-drying conditions are good, gray pores are never seen. It is because the stain-drying period of time is not long enough to thoroughly dry the stain coat, during the time that humid weather prevails.

A filler that is not dry, a short-oil filler, and a water stain coat that has not been thoroughly dried—one of these usually is the answer for gray pores in the finished piece of work. The idea has been advanced that water which contains lime or iron is a cause of gray pores. I do not believe this is true. There are many water stains—"chemical stains"—which contain caustic and subsulphate of iron, and these do not produce a gray pore if the stained surface is properly dried before succeeding coats are put on.

Acid stains have been held responsible by some as a cause of gray pores, because they contain muriatic acid and sulphuric acid. As a matter of fact there are very few stains made which contain either of these acids. Acid stains are not made from these acids, but from acid colors. The only stain in which it is really necessary to use muriatic acid, is a stain that is used for a finish known as "Acid Proof, Fire-Resisting Finish," generally used for tables, etc., in chemical laboratories.

It is better to buy fillers from some of the reliable makers. Much of the devilment credited to filler really many times does not belong to filler at all. It is a sort of "under dog" when trouble comes into the finish.

It is worth remembering, however, that *filler is the foundation* of a good finish, and the finish will not be any better than the foundation. Know your filler.

Stencil and silk-screen designs can be made in an unlimited number of attractive arrangements with different colors. These decorations can be worked and developed into the mural painting idea, and the scenes in their reproduction can be made to closely resemble hand work.

Recording instruments, starting with a simple thermometer arrangement in various parts of the finishing room and the plant, are as a staff of experts—always ready to contribute their bit of information as to what is wrong and to, in this way, help insure smooth, quality production.

Barrett Varnish Co. Moves

The Barrett Varnish Co., (lacquers, varnishes, stains, shellacs), announces removal to its newly erected office building, 1532 E. 50th Court, Cicero, Ill.

Following 16 months of research and tests by the William Lilly Paint Co. and associate chemists—delving into the problems of manufacturers using wood finishing materials, spending hours, days and months in various plants for the purpose of actual tests under shop conditions—this new material for users of varnishes and lacquers is now announced with a confidence born of practical experience.

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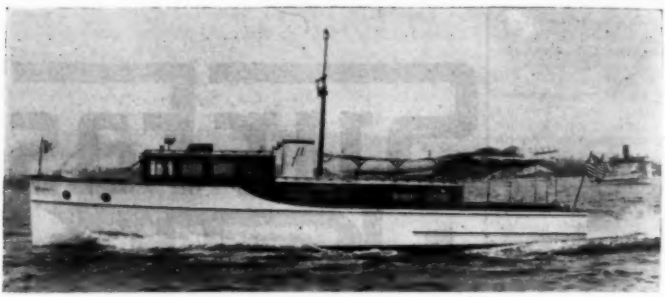


Finishing Yachts in Flat White

Suggesting how to finish the white hulls and white cabin interiors of yachts and motor boats in order to keep them looking clean and shiny white during the entire life of the paint job

By E. Perry

IT IS a proven fact that in architectural and mill finishing, flat-drying paints do not collect dirt as quickly as gloss coats, and are more easily cleaned; and, in the case of white for color, flat white possesses greater light-reflecting properties than gloss white.

Since pleasure boats are in the harbor much of the time and as harbor waters are frequently covered with a black, slimy and oily film, the vessels quickly become foul, and then appear anything but pleasing to the eye. A remedy for this condition is one which, from the painter's viewpoint, may be fairly called "heroic."

To keep the hulls white, I recommend that they be painted with white lead mixed, not with oil but with spirits of turpentine. A reliable brand of paste white lead in oil may be mixed or broken up with turpentine and allowed to stand overnight to settle. Then the top liquid is poured off, which removes about half of the original contained oil; the paste is then re-mixed with fresh turpentine, and the boat is painted with it.

Due to the small amount of oil it now contains and the thinness of film by application, the paint will dry very rapidly and permit many coats in close succession, building up a thick layer of paint.

In this way one obtains a coating of unparalleled whiteness, since it is well known that the yellowish tint of ordinary white paint is due to the oil it contains. Quite naturally, paint made in this manner is lacking in binding vehicle; it will wash off easily and expose a clean surface. There is nothing in its character or composition which has a natural affinity for water, therefore it will not become water-soaked and all come off at once. Instead, it should gradually waste

away from the hull, or if desirable it may be cleaned off with scrubbing brushes and then the remaining paint will always present a clean surface of great purity.

Of course, this necessitates more frequent repainting and the use of material which generally would be considered wasteful, but in no other way can these results be obtained.

For Cabin Interior

For a classy flat-white finish on woodwork of the cabin interior, I suggest the unusual custom of painting with white zinc ground in oil, by the following procedure:

First coat: White lead in oil, thinned with equal parts of turpentine and raw linseed oil, and the amount of drier specified below.

Second and third coats: Equal parts of lead in oil and zinc in oil, thinned with turpentine, and the amount of drier specified below.

Fourth and fifth coats: Zinc in oil, thinned with turpentine and the amount of drier specified below.

The foregoing is intended for new work (painting wood in the white), but the same materials are used for repaint jobs, except that for the first coat it is advisable to use a little less oil with the lead. Sand down the old painted surface to remove all gloss, before proceeding.

The following proportions of a high-grade master-painters' pale drier should be added to the lead and zinc pastes and oil to dry the coats in 24 hours, so the surface can be sanded and recoated over a hard surface:

For each 100-lbs. of lead in oil, add one pint of drier;

For each 100-lbs. of zinc in oil, add one quart of drier;

To each gallon of raw linseed oil used in thinning, add one pint of drier.

The number of coats of paint for a good job depends somewhat upon the kind of surface, but generally five coats produce a beautiful first-class finish of immaculate whiteness—one that holds up very well against any tendency toward yellowing.

For Over 40 Years

BESECO - LACQUERS

Have Stood the Test of Time

Nitro-Cellulose Solutions of all Kinds.

Bloomfield Chemical Co.

Works — Harrison, N. J.

P. O. Box 233 — Newark, N. J.

Cooper's Combined

LACQUER

A Paint Varnish Lacquer For Brush Dip or Spray

The Three combined in One

7-Primary Colors-7

From which all shades may be made

Chas. Cooper & Co.

10 Mulberry St. New York, N. Y.

Works: Newark, N. J.
Established 1857

BRONZE POWDERS

Gold and Aluminum and All Colors for All Classes of Work

H. KAHN & CO.

2222 N. 11TH ST. PHILADELPHIA, PA.

AUTO FINISHES & COLORS AT SAN FRANCISCO SHOW

High lights of the 13th Annual Automobile Show in San Francisco, revealing characteristic decorative and color trends, with detailed color schemes of several of the latest models

By C. R. Morley

ONE of the outstanding features brought out at the recent Automobile exhibit in San Francisco, is the stress placed on design of body and great variety of color combinations. Of the 200 odd motor cars exhibited each one was finished in lacquer.

The color having the greatest appeal is brown, although there does not appear to be any definite trend in the colors used. Pastel shades of more contrasting and unusual color combinations are in vogue. The presence of greens and grayish-greens as well as blues is noticeable, too. This is also true of richer tones of maroon. The absence of striping is noticeable, as is the fact that black is used very little.

The "spear head" effect on the hood top appears on quite a few models. Disk and wooden spoke wheels are supplanted with wire wheels finished in unusual colors which, of course, contrast with the body tone. The presence of polished aluminum and nickel on hood, radiators, and lights, as well as colored upholstery, is quite noticeable.

Some of the newer developments appearing are:

Change of fender design, the new fenders being broader; presence of trunk in rear finished in body color; engine finished in contrasting body color; shatterproof glass; extra wire wheels, carried in forward fender wells; simplified arrangement of wind shield, and presence of full-length mirror attachment in windshield.

Some of the outstanding color jobs are as follows:

Packard De Luxe Phaeton

Body	Molite Brown
Fenders	Baby Blue
Upholstery	Baby Blue
Wire wheels	Baby Blue
Moulding	Antelope Tan
Radiator	Nickel

Jordan Playboy

Body	Aluminum hood extended
Belting	2-in. black on hood top
Stripe	Red
Wheels	polished Nickel
Fenders	Red
Upholstery	Red

Willys Knight Sport Roadster

Body	Black
Fenders	Moss Green
Doors.	Black ground, green tile effect
Wire wheels	Ivory
Belting	2-in. green through top of car

Stutz 5 Passenger

Body	Meadow Green
Window reveals	Ivory
Belt moulding	Ivory
Wire wheels	Aluminum
Trunk	Green
Fenders	Ivory
Top	Green

La Salle Sport

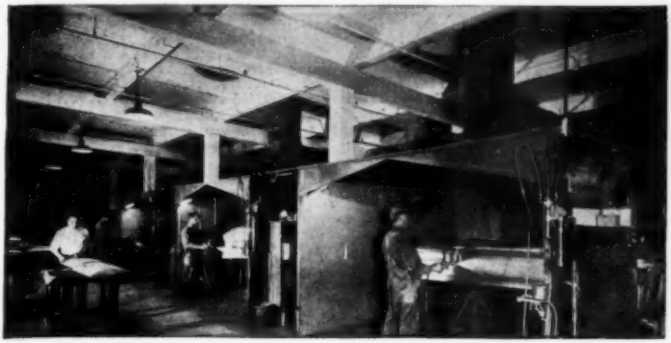
Body	Ivory
Fenders	Rich Blue
Stripe	Rich Blue
Wire wheels	Ivory

Nash Cabriolet

Body	Van Dyke Brown
Stripe	Orange
Fenders	Black
Belt panel	Tan
Wire wheels	Orange
Top	Van Dyke Brown

Chrysler Coupe

Body	Van Dyke Brown
Fenders	Van Dyke Brown
Wire wheels	Orange
Radiator	Van Dyke Brown

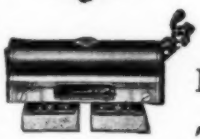


Paasche standardized "explosion-proof" airfinishing booths are suited for every need and purpose. They are healthful, fireproof and economical. They have passed the requirements of all authorities. Send for new Bulletin B-29.

Paasche airfinishing equipment

Saved $50.64

Increased production 300%



The Paasche airrubbing machine gives 1600 strokes a minute. You get a smoother finish, faster work, less fatigue and more uniform results. It will cut those sanding and rubbing costs. Send for bulletin I-27.

New equipment cost only $95.55

THESE are the net results obtained over a period of one year on just one operation of finishing wood burial boxes with Paasche airfinishing equipment. This manufacturer* is effecting tremendous savings by standardizing on Paasche equipment. We will gladly cooperate with your finishing foreman in recommending the proper equipment for most efficient and economical production.

Paasche Airbrush Co.
1921 Diversey Parkway, Chicago, Ill.

New York	Cleveland	Dallas
Boston	Detroit	Los Angeles
Philadelphia	St. Louis	San Francisco
Pittsburgh	Minneapolis	Seattle
	Denver	

A. R. Williams Machinery Co., Toronto

*Name on request

IF3—Gray

Studebaker 5 Passenger President

Body	Silver Pine
Window facings	Silver Pine
Fenders	Burnt Buff
Wire wheels	Coach Green
Belt panels	Burnt Buff
Belt mouldings	Coach Green

Studebaker, Commander Roadster

Body	Canary Yellow
Fenders	Black
Wire wheels	Canary Yellow
Belt panels	Canary Yellow
Belt Mouldings	Black

Graham Paige Coupe

Body	Chinese Red
Belting	Black
Fenders	Black

Marmon 5 Passenger

Body	Rich Wine
Fenders	Red Maroon
Wire wheels	polished Aluminum
Tire cover	Red
Radiator	Black
Belt panel	Red
Pin stripe	Ivory
Top	Red Maroon

Franklin Sportster

Body	Sky Blue
Fenders	Rich Blue
Stripe	Red

Chrysler Imperial 7 Passenger

Body	Ivory
Fenders	Mouse Gray
Wire wheels	Ivory
Stripe	Mouse Gray
Upholstery	Ivory
Top	Ivory

Studebaker, President Roadster

Body	Alhambra Tan
Fenders	Bombay Brown
Wire Wheels	Orange
Belt panels	Jonquil
Belt mouldings	Bombay Brown

Lincoln Coupe

Body	Ivory
Fenders	Black
Wire wheels	Black
Radiator	polished Nickel
Top	Black
Moulding	Gray

Graham Paige Coupe

Upper Body	Apple Green
Lower Body	Ivory
Belting	Chinese Red
Fenders	Black

This represents the outstanding color combinations. Several exhibits by some of the other leading manufacturers of motor cars were either finished along some of the lines above mentioned, or revealed a trend toward the combinations as we have known them for the past three years. Exhibitors of trucks, motor boats and airplanes have the same trend insofar as combinations are concerned. Aircraft, of course, calls for vivid colors, which are easily discernible from the ground; this color trend usually constitutes, red, green, yellow and blue.

The vogue for striping continues; furniture, automobiles and other of the larger products receive some of this work on their way through the finishing department. Lining and striping break the monotony of the solid color finish.

A properly developed base for lacquer is most important; lacquer in succeeding coats magnifies the surface scratches and cavities. This gives great importance to the sanding and rubbing operations in the lacquer finish.

Chemists and fire experts state that the greatest fire hazard in finishing departments is from the collected and accumulated mixed nitrocellulose, pigment, and gum dust. Good housekeeping is practically the only answer to this problem.

Made *free* from gum

Auto Lacquers

Of Dependable, Superior Quality

We have been manufacturing for 70 years at Newark, N. J.

Chas. Cooper & Co.

10 Mulberry St. New York, N. Y.

Works: Newark, N. J. Established 1857

RAUX GUM RESINS

Rosin Ester Gum 115°C
Congo " " 135°C
Manila " " 140°C

Gums cut, fused or treated to meet individual requirements.

ROBERT RAUH, Inc.

480-490 Frelinghuysen Ave., Newark, N. J.

give us a chance to prove this!

*In your own plant, our demonstrators will show you the latest effects and the shortest methods to produce a finished result that will add sales value to your line.

—that based on the actual experience of many customers, and not merely through laboratory research work, we are in position to present a complete system for finishing your particular product, guaranteed to successfully meet the popular public demand for the unique, colorful, modernistic, antique or plain finished surfaces.*

AD-EL-ITE Wood Lacquers, flat and gloss—For bedroom, dining room and living room furniture, church furniture, phonographs, radio cabinets, refrigerators, pianos, school furniture, fixtures, etc. Will gladly finish samples for your inspection.

Our demonstrators are men well-qualified to help you; or we will be glad to answer your inquiry by mail, as you choose.

Adams & Elting Company

1833 Seward Street
Chicago, Ill.

Oriental Lacquer Work Secrets Revealed

Expert Finisher in charge of Lacquer Dept. at Mikami Studio, New York City, explains the composition and use of Urushi lacquer, and declares that it is applicable as a modern industrial finish for certain high-class work

By F. S. Araki

ORIENTAL lacquer work has been a wonder and admiration of the Western Nations ever since its introduction in the 17th century. It was generally conceded that the materials and methods of working were secrets kept by the native workers. Even to this day many speculations are offered in place of the correct answers.

In Queen Anne's time (early in the 18th century) the demand for lacquer ware became so great among the royalty, nobility and wealthy of Europe that the French contrived to imitate this esoteric Oriental art and a highly artistic system of finishing was developed by Robert Martin and his four brothers. They were all expert finishers and artists.

While we know that in many cases the designs were made in France and manufacturing was done in the Orient, a large majority of lacquer objects were produced right in the city of Paris.

Some of the articles which I have had the privilege of examining closely or repairing personally were really very remarkable pieces of work, and only a few modern workers can turn out this class of work.

However, these articles should not be confounded with the genuine Oriental urushi work; they do not contain one particle of urushi. They are made of shellac, alcohol and gum sandarac, etc. and properly should be known as the European lacquer work.

Centuries Old

In Japan, the lacquer work seems to have been a highly developed art 12 or 13 centuries ago.

I have seen lacquer art objects and a sword belonging to the Emperor Shobu (7th Century) at Todaiji, Nara.

Some of these articles were in colors and inlaid; they were finished with a natural tree-varnish called *urushi*—an exudation of *rhus verniciferus**, and probably in a concentration of 75 percent or more. That is, the varnish used was of fairly good quality and did not contain too much adulterants.

Chinese history mentions urushi as far back as 3000 years ago, and it is possible that lacquer ware has been in use since time unknown.

Chinese urushi is not as good as Japanese kinds, probably due to the climatic conditions; besides, they are accustomed to mix it with adulterants such as oils and animal blood to the extent of 50 percent or more. But it is to China we must look for sources of supply if we are to use this material in this country. Japan

* The Japanese varnish tree.

Shellac becomes a new and far superior material when mixed with—

Murphy Waterproof Mixing

A material has been developed by the Murphy Varnish Company that is truly revolutionary. It is called Murphy Waterproof Mixing and is for mixing with shellac. Just as Vanadium improves the properties of steel, this material improves shellac in every important respect.

Murphy Waterproof Mixing makes shellac much tougher and more elastic—not merely twice as durable, but 3 or 4 times as durable and improves its working qualities, whether used with brush or spray gun.

Murphy Waterproof Mixing is absolutely waterproof and prevents shellac from turning white or from scratching white.

Shellac when mixed with Murphy Waterproof Mixing, dries as quickly as shellac itself, seals far better, eliminates pinholing and gives increased anchorage, all due to better pore penetration.

Sanding costs are cut almost in half.

When you consider all these points and the advantages they would bring to you in your own finishing jobs, you will undoubtedly want to know more about this remarkable material.

Order a quantity of Murphy Waterproof Mixing now, while you are thinking about it. Or send for further information or ask for a demonstration.

MURPHY VARNISH COMPANY
Newark San Francisco Chicago
Essex Varnish Company, Newark
(Associate Company), *Baking Material Specialists*

MURPHY FINE FINISHES

Famous for 64 years among architects, master painters and makers of products requiring a fine finish.

Air-drying and Baking Varnishes
Enamels, Lacquers and Stains for Brushing, Spraying and Dipping

can not produce enough for its own domestic use and imports a large quantity from China—I believe over 1,000,000-lbs. are available for export annually.

Pyroxylin and Bakelite

The pyroxylin lacquer we use now is the best we have had so far for all-round purposes; it is an excellent material and leaves very little to be desired—and any objectionable points will be removed by the chemists very shortly.

For the better and more special kinds of work I believe Bakelite varnish and enamel will find their own place in the near future. They are easy to work and they resist water, heat, acids and mild alkalies, and take a better polish than pyroxylin lacquer; they are lasting and sufficiently cheap—very nearly as perfect a varnish as we can find except urushi.

For high grade work requiring beauty and permanency, urushi might be more suitable. Jewelry and tableware are examples. We are using more and more every year. There seems to be a strong possibility of using this finish on scientific instruments, airplane propellers, pontoons, engines, luxurious yachts and automobiles (for both exterior and inside finish) as soon as its true nature is once known. The present indications show it.

Characteristics of Urushi

Urushi can be dried by moisture or by heat. There is a considerable difference in the physical and chemical actions of drying as between heat drying and moisture drying. I shall have occasion later to discuss this subject. Urushi does not require 300 coatings—not under any circumstances. Suppose each coating be only one quarter the thickness of this paper; in the end the 300 coat finish would be more than ¼-in. in thickness. There is a mistaken idea that the thickness of film governs the strength of the varnish applied.

On the smooth surface of metal or glass, it is demonstrated a thin, even coat of varnish gives better protection than two thick rough coatings. It is true we give as many as 50 coats of urushi, but only when we are working with designs—and then again, it must be remembered we wipe off the excess of urushi, leaving only the trace or an unusually thin film. For ordinary work in plain colors, very rarely more than six coats are required, and for cheaper work a priming and finishing coat are given and not even rubbed or polished.

The cost of urushi is high but not prohibitive, inasmuch as it will cover a large surface and it works very easily in a warm room, and there is no waste.

The toxic action of urushi is grossly misunderstood. Some investigators give out ludicrous remarks. In fact, I have not so far come across a statement about urushi which is reliable and trustworthy. We are like the *Blind Men of Hindustani** in this respect.

The irritant contained in raw urushi is a soluble volatile acid or oil, and I believe it is possible to remove it. At any rate urushi

(Continued on page 91)

*Six blind beggars stepped out to "see" an elephant. The first patted the huge beast's side and said, "He is like a wall;" the second felt only the tusk and declared, " He is like a spear;" the third took hold of the trunk and exclaimed, "He is surely like a snake;" the fourth, grasping one of the elephant's legs, cried; "He is like a tree." The fifth, a tall man, seized one of the huge ears and insisted, "He is like a big fan." The sixth caught the animal's tail and shouted, "You are all wrong, the elephant is exactly like a rope."

RESULTS

FINE cabinet work must have fine finishing to get results.

For seventy years Thresher has been making Varnishes, Enamels and Lacquers for users who demand durability with fine finish. Thresher's Varnish and satisfactory results have been synonomous terms thru all these years.

To you, as a maker of fine furniture, or other articles requiring beautiful, enduring finishes, this is indicative of the results you may expect with Thresher products.

Write us for particulars and samples.

THE THRESHER VARNISH COMPANY

1150 E. Monument Ave. **Dayton, Ohio**

THRESHER'S MADE GOOD SINCE 1859

THRESHER

VARNISH · ENAMEL · LACQUER

Kindly mention INDUSTRIAL FINISHING when writing advertisers

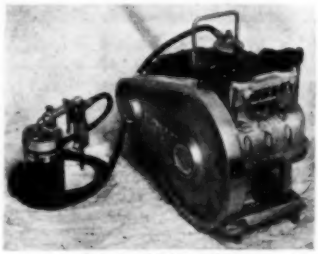
New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

New 4 & 8-cylinder Spray Units

The C. L. Tittemore Co., 7 Front St., San Francisco, Calif., has recently brought out two new lines of portable spray-painting outfits. The "Model C"' is a 4 cylinder spray unit built of all metal construction—cast iron pistons, steel cylinders, and semi-feather intake and exhaust valves so placed that it is impossible for a valve to drop into the cylinder and cause any damage. For lightness, the base, guard, pulleys and crank case are made of aluminum.

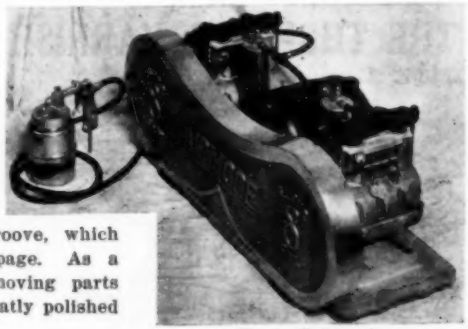
This unit weights only 50-lbs. and the four cylinders pump the necessary air in a smooth flow at uniform pressure, so that an air storage tank is unnecessary. A special intake and exhaust filtering device is included as standard equipment, and this assures the operator a supply of clean dry air for spraying. Power from the standard ¼-h.p. motor is transmitted to the compressor by means of a noiseless round belt running in a V groove, which eliminates any slippage. As a safety factor, all moving parts are inclosed by a neatly polished guard.



The 4-cylinder unit.

The "Super 8-cylinder Model T," is built along the same lines as the "Model C" except for the addition of four more cylinders; it is driven with a ½-h.p. motor and furnishes twice the volume of compressed air.

Both units come equipped with either a round or fan-type spray gun.



The 8-cylinder unit.

Here's high-gloss finishing lacquer that lasts . . .

You have wanted a clear finishing lacquer that stands up in spite of extreme heat or rapid temperature changes—here it is. Berryloid 507 Clear is like all other Berry Brothers' products—it *wears*. Even direct sun rays will not disintegrate this high-gloss protective film. It is airplane-tested. Heat, rain, snow and vibration do not harm it. Berryloid 507 Clear is recommended for outside or inside use and is equally effective on wood, fabric or metal. It brings out a high luster and permanently protects lacquer or enamel undercoats. Learn more about this amazing finish. Write or wire for complete information and samples.

Fine Industrial Finishes

BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan *Walkerville, Ont.*

Branches in Principal Cities

A-LAC-O LACQUERS

SPECIALLY
Developed Industrial
FINISHES

There is an A-LAC-O finish for every industrial need . . . based on extensive experience.

☐ LACQUERS
☐ ENAMELS
☐ PRIMERS
☐ "NO-TARNISH"

Check type finish you use. Clip out, and *pin this advertisement to your letterhead* — TODAY. Our Engineering Dept. will make some excellent recommendations for better application - lasting durability — greater economy!

Elasticity
Durability
Non-Porosity
Adhesion

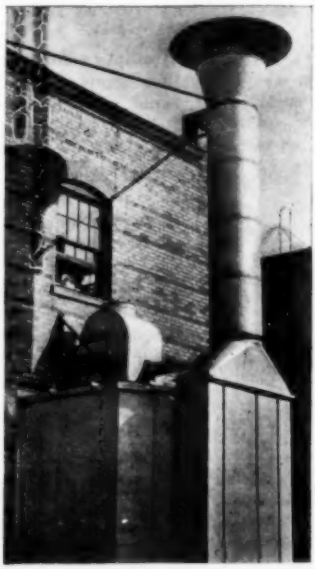
ATLANTIC CHEMICAL CO.
Irvington, N. J.

ATLANTIC CHEMICAL CO
Lacquer
A-LAC-O
PRODUCTS
IRVINGTON NEW JERSEY

The operating or spraying pressure on "Model C" in continuous use is 35 to 45-lbs. with a volume of 2½-cu. ft. of free air per minute. The "Model T Super 8" doubles up on the volume and has a spraying pressure from 40 to 50-lbs.

Improved Spray Booth for Outside Installation

The Grand Rapids Blow Pipe and Dust Arrester Co., 526 Monroe Ave., Grand Rapids, Mich., in announcing the adaptation of the Newcomb spray cabinet for outside installation, is particular to state that this adaptation in no way alters the Newcomb principles of construction. There are, however, features incorporated in it which are necessary to make the outside installation as effec-



Typical outside installation of Newcomb spray cabinet.

tive in operation as is the Newcomb cabinet in indoor operation.

According to the manufacturer, the Newcomb syphon-ventilated spray cabinet for outside installation has the following points, which are the result of intensive study and long experience:

1—It is insulated against heat and cold.

2—Fan and motor are outside building.

3—The cabinet, placed outside, saves about 100-sq.ft. finishing room floor space.

4—Stack is eliminated where finishing room is located on top floor.

5—Cabinet is equipped with drains in floor, helping to prevent water damage to building and contents in case of fire in finishing room causing sprinkler heads to open.

6—Cabinet gives effective ventilation.

7—Eliminates fire hazard in finishing room from fire in cabinet.

8—Meets Underwriters' requirements.

New Portable Airpainting Unit

The Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill., announces a new compact spray finishing unit which is said to be particularly suitable for touch-up work, shading and light finishing and refinishing jobs. According to the company's circular, "The uniform fan spray turns in any direction and is adjustable for small and large spray by simply turning the aircap 'in' for wide fast spray and 'out' for smaller spray."

Other features include, "patented clamp-tight cover and an unbreakable metal cup, convenient pistol grip and leak-proof valve."

This ¼-h.p. light electric port-

The Blue Knight's Column

"YOUR visit proved that through the use of your materials our cost has been reduced and our finishes improved."

When you go out to see a customer and work like the dickens to get everything running smoothly, it certainly feels good to have him send you a pat on the back by mail, and close with " . . . if this letter is of any use to you as a reference, you are at liberty to use it."

Right now, everyone in this plant is up to his neck in hard work. A great number of lacquer users have, with one accord, suddenly decided to accept our invitation to show them the particular merits of a custom-made lacquer service as we render it.

This places us in the very unusual position of announcing that, for the present, working as we are to capacity, we cannot accept any new accounts! Since we feel that we could not render them the only kind of service we are willing to perform—it is better that we wait until we are in a position again to do so.

In the meantime, we can recommend that you write the Sales Department for samples of our Clear Lacquer No. 1510S and our Lacquer Enamel No. 1510, whose special properties are perfect adhesion and permanent flexibility on Brass, Aluminum and Nickel Silver. These lacquers have successfully met the problems of many manufacturers.

The Blue Knight

ROXALIN FLEXIBLE LACQUER COMPANY
101-6 SEVENTH AVENUE
LONG ISLAND CITY

"Ty-Loid"
Lacquer
Enamels

and Undercoatings

We manufacture a complete line of Primers and Surfacers in oil and pyroxylin, and a complete line of colored Lacquer Enamels.

Our No. 91 Brown Oxide Primer is an Oil Primer composed of best oil and iron oxides, which are the best preservatives for metal. No. 91 Brown Oxide Primer will force dry in a few hours or will air dry over night. It is neutral to our No. X-C. 100 P-X. Oxide Surfacer or Lacquer Enamels, and does not bleed when colors are applied over it.

Our No. X-C. 100 P-X. Oxide Surfacer is heavy bodied, requiring a fifty-fifty reduction and is ground fine in pebble mills to give a smooth surface when sprayed. It requires little sanding to surface ready to lacquer over. There is no swelling of undercoat when lacquer is applied; therefore, no shrinkage in file and surfacing marks after the finish is completed.

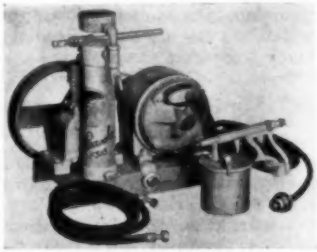
A trial order of these goods will convince the most critical and make you more friendly with our line.

Manufactured by

The Western Reserve Varnish Co.

1251 Marquette St. Cleveland, O.

able airpainting unit has a capacity of 2 to 3-cu.ft. of free air per minute. In addition to the ¼-h.p. motor, the equipment includes



Complete portable airpainting unit.

1¾x1¾-in. air compressor, self-tightening belt, patented water and oil separator with gauge, pop-off valve and handle for conveniently carrying. The equipment is mounted on a metal base in one unit, with 15-ft. of electric cord and an attachment plug.

Portable Motored Mixer

The Mixing Equipment Co., Inc. (manufacturers, engineers) 229 E. 38th St., New York City, announces an interesting line of directly-motored portable mixers which are suitable for mixing or agitating finishing materials.

The essential parts of each mixer include a driving motor, an attached clamp for anchoring the device to the top edge of a container, and a drive shaft which carries one or more propellers or "beater blades" which are submerged in the liquid contents of the container.

These mixers are made in different sizes and models; for example, the laboratory model is driven by a 1/20-h.p. motor while larger sizes are powered with ⅙, ¼, 1/3, ½, ¾ and 1-h.p. or larger motors, according to the service

for which they are intended. In some models the propeller shaft is directly connected to the motor

Small portable mixer fitted to small container; also three typical propeller shafts with propellers attached.

shaft, while in others a gear drive is employed to give reduced speed.

The accompanying illustrations show three typical propeller shafts with propellers attached, and a container to which a mixer is fitted for service.

Penetrating Stain Doesn't Raise Wood Grain

The age old problem of grain-raising has been under scrutiny and tests for many years. Systematic work and basic research on the cause of grain-raising has occupied the attention of engineers and chemists only within the last two or three years. One is struck with this fact when trying to gather the scientific literature on the subject.

The problem of grain-raising has been attacked largely through trying to add to the water stain something that would retard or eliminate this expensive feature of staining wood. These measures resulted only in a partial reduction

Try Stille's #300 Finishing Lac!

Originality - Universality

1. Will not bloom or blush, turn white or gray at any time, under any climatic or extreme weather condition.

2. Dries quickly, sands easily and allows for sanding one hour after application, if necessary.

3. Mixes to any degree with Pure Shellac. Can be reduced in body when necessary, with either Alcohol or our Special No. 300 Finishing Lac Reducer, which is only slightly more expensive than Alcohol. For first coat work we recommend a reduction of four parts of No. 300 to one part of Alcohol or our No. 300 Finishing Lac Reducer.

4. Economically it has an excellent covering capacity, and should be sprayed at about an 80 pound air pressure to obtain best results. It can be brushed or dipped if necessary.

5. Absolutely waterproof. Its remarkable sealing quality prevents bleeding when used over stain as a succeeding coat, and also prevents blooming, spotting and cracking where the water seeps thru any crack, edge or end wood.

6. As an undercoat, it will not crack under lacquer, varnish or shellac. As a final finish, it can be used over any type of stain, on any kind of wood with excellent results. A second coat can also be applied with excellent results one hour after the first coat has been applied, if necessary. Succeeding coats will also sand easily.

7. Adheres to metal and fabric as well as wood and can be used with equally good results under bronze on lamp stands as well as for coating muslin and other fabric lamp shades, etc.

8. It can be furnished in either Clear, Orange or Black.

We have obtained these facts from actual tests, in our laboratory, coupled with the many good reports we have received from customers we are now supplying, and we know that you, too, will find a working sample to be self-convincing on every point and the price of this item to be of interest.

May we send it along?

E. T. STILLE & CO.

Main Office and Factory
2343 Greenview Ave.
CHICAGO, - - ILLINOIS
Southern Office and Factory
High Point, N. C.

Economical Marketing

To make sales more easily than your competitor, a big portion of your effort must be accomplished through the finish on the merchandise.

BARRETT

Stains - Fillers
Pure Shellac Varnishes
Shellac Compounds
Shellac Substitutes

Gloss Lacquers Flat Lacquers
Lacquer Primers Lacquer Enamels
Varnishes
Shellac Gums and Alcohol

Meet the most rigid requirements and at a price you will regard as reasonable.

Accurate Control of All Operations Insures Highest Quality

Barrett Varnish Company

Originators of Dependable Finishes

1532 S. 50th Court, Cicero, Ill.

of grain-raising since it has been shown by several investigators that so long as even a measurable percentage of water is present in the stain some grain-raising results.

The most important reason for trying to find a retarder has been that no way was known to keep the typical and most commonly used acid aniline dyes in solution, except by the use of water. Wood finishers who take pride in their product have insistently clung to their favorite fast-to-light acid water dyes, and many have tried out the various suggestions aiming to reduce or eliminate grain-raising in water stain mixtures.

Usually the results were disappointing, since they only resulted in a partial elimination of grain raising. Some woods behaved fairly well; other woods, notably bad actors, would insist on "kicking up" in spite of all remedies.

Users of wood finishes have been very patient in giving attention to anyone that had a suggested remedy for grain raising. In this connection it is interesting to learn that one firm claims that the old favorite acid anilines are now available in thin, volatile liquids which penetrate like water stains, but have no water in their composition—W. F. K.

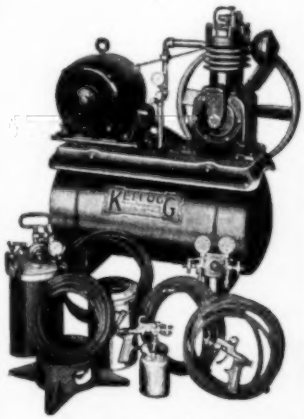
New Paint Spray Outfit

The Kellogg Manufacturing Co., Rochester, N. Y., has brought out what is called "Spray Equipment Outfit No. 6," which is illustrated herewith.

According to the manufacturer, "The paint guns, pressure container, transformer and associated parts are the last word in paint spray equipment.

"Air for operation is furnished

by a Kellogg Model 152 X two-cylinder 3½x4-in. compressor driven by a 3-h.p. motor. This compressor, which has dual rib-



A complete portable outfit.

bon-type valves of extra large area, displaces 20 cu. ft. of air per minute—more than enough to operate both of the spray guns at full capacity. Automatic pressure unloaders, built into the cylinder head, govern the air pressure and save power by unloading the compressor when air requirements are less than the maximum."

Oriental Lacquer Work Secrets Revealed

(Continued from page 76)

lacquer ware is not poisonous after it is dry. We use lacquer spoons, dishes and bowls—even chop sticks in Japan—and I never heard of anybody being poisoned.

Mildly Poison to Some

Workmen occasionally become poisoned by coming in contact with the vapor while opening a

Pin the Coupon to Letterhead

If You Buy Respirators for Safety— Why Not Buy the SAFEST?

PULMOSAN Respirators ranked *first* in the official test by the National Safety Council ... with a rating of 99.7% efficiency! Interchangeable parts assure longer *service;* exclusive features guarantee comfort.

Incidentally they cost no more. For lacquer, pyroxylin paint, enamel and lead spraying .... $6.00 with *Extra* cartridge.

Originators of the Curved Edge Cushion Respirator

PULMOSAN
SAFETY EQUIPMENT CORP.
174 Johnson St. Brooklyn, N. Y

Kindly send details of your respirator for.....spray work.

NAME.....
FIRM.....
ADDRESS.....

WATEROIL

REG. U. S. PATENT OFFICE

Will eliminate stain difficulties

Order a Trial Drum or at Least Five Gallons!

"WATEROIL" is the result of water colors definitely dissolved in oil base without precipitation—a stain material that eliminates the usual stain difficulties, producing a better foundation for surfacing coats and lessening time of staining operations.

Available in 4 "fast" shades, light and dark walnut, red and brown mahogany. WATEROIL meets every need in staining the wood. Many firms have adopted it after a thorough trial.

This is your opportunity to take advantage of what science has done for finishing. Will you try it?

Satisfaction Guaranteed

V. J. DOLAN & COMPANY

Wood finishing materials of "Unquestionable Quality"

1830-32 N. LARAMIE AVENUE CHICAGO, ILLINOIS

YOUR DOLLAR'S WORTH

A dollar spent in finishing materials should buy for you more than a certain quantity of varnish or lacquer.

It should purchase Integrity—an honest effort to give you the best the seller can supply for the price.

It should purchase Ability—skill in formulation that makes the product do the work you wish it to do under the conditions which you encounter.

It should purchase Service—a much abused word that to our minds means the personal contact of the heads of the organization with the individual consumer and his problems.

We believe profoundly that your dollar will buy more nearly 100 cents worth of these qualities with us than elsewhere. Otherwise we could not hope to succeed.

THE Joseph F. Glidden FOUNDER AND PRESIDENT VARNISH PRODUCTS Co

12900 Berea Road Cleveland, Ohio

Varnishes—
Gloss
Flat

Lacquers—
Wood
Metal
Enamels

container of raw urushi, or by permitting urushi to come into direct contact with the hands. Some individuals are very easily affected by the slightest cause, due probably to the accumulated toxin in their blood; such persons should be very cautious about entering the urushi workroom or shaking hands with any of the workers.

The symptom of poisoning is not unlike ivy poisoning, only in some cases much worse. This, usually is for the first time; in subsequent handling the toxic action is greatly diminished, the first poisoning acting as the vaccine. The worst that can ever happen is a red spot or two. They do not even swell up.

I have been vaccinated many times, but each time the germs seem not to thrive on my system and the wounds heal up very rapidly. Likewise, in my experience, I do not know the sensation of urushi poisoning—except as I saw the victims and imagined how they felt.

Investigate Its Merits

Having dispelled uncalled-for fear, I advise any brave man to go to it and find out more facts; the reward will be proportionate with your efforts. America is sold for colors and it will remain so for a number of years to come. Go to it!

The so-called Oriental secret, we now know—at least in part—was prompted by humanism on the part of those who used it. They did not allow anybody to come in where lacquer was being used, first because they did not want dust stirred up in the room to spoil the finish; and second, they did not want innocent bystanders poisoned by the action of toxic fumes from the lacquer.

Kellogg Paint Spraying Outfit
3-A

A Portable Outfit for the Application of Any Paint Material

This is an ideal outfit wherever electric current is available. Compact and weight-saving design make it readily portable, while the pressure feed painting equipment insures saving in labor costs. A suction feed cup is supplied so that small lacquering jobs can be accomplished without loss of material.

The outfit consists of:

Model EM-261-SXPO Portable Compressor
Type "T" Transformer
Type "M" Pressure feed gun
Type "D" Spray gun with cup
Holder base
Extra insert container
25 ft. main line air hose ½-inch
25 ft. fluid hose, ⅜-inch
25 ft. air hose, ⅜-inch
Fluid cut-off valve
Air-adjusting valve

Price Complete:
$324.15

Write for illustrated literature on this and other Kellogg Paint Spraying Equipment.

Kellogg Mfg. Co.
129 Humboldt St.
Rochester, N. Y.

FIXES
SCRATCHES
MARS, HOLES
Scarred Finishes

Where Finish is damaged, the quickest and easiest way to permanent repair is with

CAMPBELL'S STICK SHELLAC

This is melted in the hole, dent or scratch. The damaged place is then rubbed down and polished. The Shellac will not shrink nor check and is extremely tough. It is indeed the easiest, the quickest, the most economical and only permanently satisfactory method to repair serious injury to any finish.

Stick Shellac color card and booklet "How to Repair Varnished Surfaces" will be sent you free upon request.

The M. L. CAMPBELL CO.
1007 W. 8th St. Kansas City, Mo.

CORUCO
F. O. S.
is the
MASKING TAPE
you have been looking for.

Send for free sample and prices

The Consumers Rubber Co.
1302-04-06 Ontario St.
Cleveland

Motor Car Lacquering Off-Color Troubles

(Continued from page 30)

the use of pigments of different shape or density in a single or particular lacquer enamel, in order to prevent "floating" or separation in the film.

3—The use of unstable nitrocellulose.

4—The use of blown or oxidizing oils containing some drier as lead, manganese, sulphur, etc.

5—The use of lithopone with certain plasticizer, or impurities such as lead oxide in zinc oxide, which may be used as base pigments in lacquers.

6.—The action of impure or unstable solvents present in the lacquer or thinner used. Solvent may contain too much acid or may tend to hydrolize and react with pigment in lacquer.

7—Unstable color of pigments under certain conditions in lacquer while in storage, due to oxidization or reduction reaction.

Mist Coating

Here is another point I almost forgot to mention: It sometimes happens that hoods are mist-coated while bodies are not, or vice versa; or it may be that more mist-coat is applied to one than the other, if they are done by different shops as is the case in question. This is liable to give a difference in tone that may be very noticeable in light colors or tints. This was mentioned in Dr. Given's article in July 1928 INDUSTRIAL FINISHING, (pages 44, 46, 51 and 52).

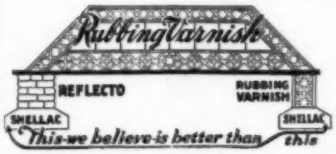
Each new finish deserves its trial, for unless it is an improvement or a development from some point of view, it never would have appeared on the maket.

The Ideal Building Varnish

Why Should Reflecto Replace Your First Coat of Rubbing Varnish ?

More body
Better drying
Better sanding
A tougher finish
More production
A saving in costs

REFLECTO is guaranteed to knit



Write and let us explain all the WHYS.

RELIANCE VARNISH CO., Inc.
Louisville, Ky.

A Color and Decorative Service

◆

Bradley-Hurtz service includes the creation of smart and correct color harmonies with appropriate decorative designs of the latest mode—plus a production service for application at low cost.

Our studios are also retained as Styling Engineers and Color and Design Counsel by a group of manufacturers of diversified products—unique in this field.

Users of our finishing materials pay nothing for this service.

Your inquiry will be handled promptly and confidentially.

BRADLEY-HURTZ CO.

2626 S. Dearborn St.
Chicago, Ill.

ENAMELS LACQUERS INDUSTRIAL PAINTS VARNISHES

Wooden Heels Lacquered in all Colors

The demand for color and the new methods discovered for satisfying this demand are always of interest to those engaged in the industrial finishing lines. In this connection it is interesting to note that the dip lacquer process is soon to replace the former costly process of covering the wooden heels of ladies' pumps and oxfords.

Homer F. Danforth, an employee of the Endicott-Johnson Corp. (Boots, shoes, etc., Endicott, N. Y.) has perfected a new process in the finishing of wooden lifts on women's footwear that marks a notable achievement and advance over the old process of covering these heels with celluloid. Every experiment made by Danforth has proved conclusively that his methods, which are patented, together with the machinery used in the process, bring a new meaning to color in the shoe industry.

At the present time Mr. Danforth, assisted by a small force of girls, is finishing 1,000 pairs of heels each working day. After the plant is in thorough working order, one of the Johnston City (N.Y.) plants of the company will devote an entire department to the lacquering of these wooden heels in a wide range of colors.

Practically any color desired to blend or match the color of a pump or oxford can be attained in the usual way, but a special kind of lacquer, devised by Mr. Danforth, is to be used. Under tests the dipped heels stand up under the severe use of an iron hammer, and show no marks or mars from mallet blows.

Within the next few months ladies' footwear bearing the newly devised heels will probably

be on the market, and this event will score another big success in the use of lacquer and colors. —A. J. Owen.

Birch Fixtures

Birch is being used quite extensively in some classes of store fixtures, and I think it is becoming more popular for this purpose. It is very strong, easily surfaced and sands easily. It takes most colors satisfactorily, with only a slight raising of the grain when water stains are used.

However, birch has one peculiarity which at times stands out noticeably, and it is not at all pleasing. Recently, while in Chicago, a prospective buyer of store fixtures called my attention to one of our competitor's counters, built of birch wood and finished in a red mahogany. One part of the end of the counter showed up very much darker than the remainder of the finish. Upon turning it around it matched very good.

In other words, sometimes when you look lengthwise down a piece, it looks dark, but when you turn it around it is the desired shade.

Editor's Note—Probably this is due to the way the tree grew, (slightly bowed or crooked) from which that lumber was cut, or the way it was sawed at the sawmill. The same effect, I believe, is noticeable in certain other woods, especially, when the lumber is cut from comparatively small trees or trees that did not stand close together in a forest.

Air filters for the finishing department, especially when the plant is located in manufacturing areas, insure air not contaminated by soot and dust particles.

LIGHTNIN
MIXERS
Reduce mixing costs 90%. More uniform quality of materials guaranteed. No lumps to clog; no air bubbles.
Thousands in Use

Non - spark totally enclosed, self - ventilated MOTOR . . .
Makes the "Lightnin" Mixer a safe unit for mixing lacquers, enamels, surfacers, primers, etc.
Try One Without Obligation!
No Installation Expense
Portable—Clamp on Any Tank
All Sizes and Speeds
Send For Data!

PATENTED
MIXING EQUIPMENT CO., INC.
229 East 38th St. New York

TO THE MANAGER OF ALL INDUSTRIAL PLANTS

You are constantly confronted with a problem in your finishing room, and plant in general and the solution of which is most essential in your particular work.

THE PROBLEM

How can I improve the lighting in my plant without the addition of artificial light?

THE SOLUTION

Have your finishing room and plant painted with a paint most suited for your particular need.

All paints are not formulated to diffuse light to flow out evenly and have that ever enduring finish and whiteness.

When considering the finishing of your plant interior, by all means specify **FRENCH'S MILL WHITE**, and as soon as it is properly applied you have the solution to your one big problem.

FRENCH'S MILL WHITE is made in a flat and gloss finish. We solicit your inquiries.

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Paints—Enamels—Varnish—Lacquer
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are those who were known as the "hard-to-please" ones.

CADILLAC SHELLAC COMPANY
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ANNOUNCING

An entirely new principle in spray guns. We have succeeded in perfecting a new fan spray gun, our Model M-29, which far surpasses anything on the market today. It atomizes perfectly, syphons freely, can be used with either container, pressure tank, or gravity feed types, is the fastest operating gun developed, uses a minimum amount of air, **CLEANING is SIMPLIFIED,** and is fool-proof in operation.

We have also succeeded in developing a cone spray gun, our Model M-14, which will increase production materially. The spray-man's troubles are ended now in making color changes. Our new gun permits a finisher to mix all his colors in different containers at one time. He can then change from one color to another in **FOUR SECONDS** without **CLEANING.**

These are startling statements and for proof of same, see announcement in next issue.

EUREKA SPRAYERS INC.
87-28 130th Street Richmond Hill, New York
EUREKA SPRAYERS CONTINUE TO EXCEL

QUESTIONS AND ANSWERS

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Is Steel Wool Used?

We would like to know all the uses of steel wool in industrial finishing. Also to what extent it is used?—Y. & R.

Steel wool is used in place of sandpaper, especially for smoothing the primer and intermediate finish coatings on surfaces other than those that are flat (and easily sanded,) for example, intricate turnings, carvings, embossed and twist mouldings in wood, composition and metal.

Due to its convenient flexibility and pliability in the hand, steel wool conforms more readily to intricate shaped surfaces, giving a more gentle and uniform abrasive cutting action which reaches the low and intermediate points and crevices in irregular surfaces, whereas sandpaper would only "hit the high places" and perhaps damage the delicate contours and profiles.

Also, steel wool is frequently used in preference to abrasive paper for producing high-lighted and antiqued effects on flat and gently curved surfaces, as well as upon the intricate surfaces just mentioned.

Steel wool is particularly useful in connection with smoothing and rubbing the hard lacquer finishes, some finishers using it in connection with rubbing oil, and with both pumice and rubbing oil.

Some finishers prefer steel wool to sandpaper for smoothing a shellaced or substitute-shellaced wood surface that is "pebbly" or rough.

We are not prepared to give any specific information as to exactly what extent steel wool is used in connection with industrial finishing. So far as our observations have extended, steel wool is not used as extensively as it should be—probably because it has not been pushed energetically in this particular field. Nothing much has been done, so far as we know, to educate finishers to its possibilities, advantages or wide application.—I. F.

Finishing End Wood

I would like to obtain information on filling end wood on pieces which require a quick, cheap and successful finishing method, and which are to be lacquered in colors.—C. S.

The finishing of end wood, to make it match the adjoining wood surfaces in point of color and smoothness, is often troublesome regardless of the kind of finish to be used. If the end wood has been smoothed up with sandpaper and if it is not too large in area, it should not need much filling for a cheap finish—provided sufficient material is sprayed on. But if the wood surface is sufficiently "open" in texture as to really re-

quire filling, then water putty is the cheapest and quickest thing to use, as it does not shrink if mixed right and is of good quality.

This material can be purchased in powder form, by the barrel, for about 8c a pound. This powder is mixed to a stiff putty-like consistency, or it may be made thinner if necessary. If the end wood surfaces are small, the stiff putty can be rubbed in by hand. On larger areas it can be pressed in with a knife. It dries in a few minutes and can be coated over the same day, with any kind of finishing material.

Usually it is best to fill the end wood after the first coat of finishing material has been applied, as then the finisher can tell better just how much needs filling, as the colors show-up the pores better.—J. K. Cooper.

Color Schemes For Reed and Fiber Furniture

I have a repair and refinishing shop specializing on fiber and reed furniture and would like some information as to the latest color combinations in vogue.—G. F. B.

I will suggest several, as follows:

Black—A satin black with banding done in a gold, the gold being made up of one-half aluminum and one-half gold. This gives a very pale lemon gold. The upholstery in this combination can be influenced by gray and orange.

Ivory—With tan or brown decorative effects; that is, the body ivory and the trimming tan to brown; the upholstery orange and black.

Gray—With yellow green and black decoration; namely, the body gray with trimming yellow green and stripe black or black rubbed in over the yellow green. Upholstery blue green, yellow and black cretonne.

Orange—With black. A persimmon orange with black rubbed in on bands. Upholstery on this to be influenced by orange and a yellow-green and black.

I take for granted that a refinisher would use cretonnes in reupholstering seats and backs. However, at the present time, much leatherette is used, and this comes in every color one can wish.—LeVera Ann Pohl (Color Expert).

To Put on Red Dots

We notice in January issue, page 80, T. M. Co. inquires as to the best method of placing red dots on a surface.

It seems to us the easiest and most economical method would be to use adhesive masking plaster and with a die cut out the round holes of the proper size; then place the plaster against the surface, apply the red lacquer and, when set, remove the plaster. Our adhesive plaster will not leave any deposit on the surface on which it is applied.—Johnson & Johnson.

Finishing Wood Slides of Window Screens

I notice a question on page 72, of December issue under the above title. According to this question, I assume that the screens have more or less excessive moisture in them. I wonder if this manufacturer allows enough room in the slides for the paint? Suppose we take, for instance, a window sash which has been hung and fitted to slide freely. Then, the finisher comes along and applies, say four or

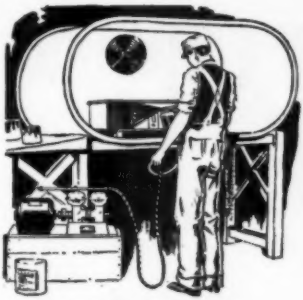
more coats of paints and enamels. The fitter did not allow for this and, as a result, the windows cannot be moved. This might be the case with those screens. I would recommend that the slides be coated with pure linseed oil—with a small amount of turpentine and dryer added. This can be colored to make any shade desired and, since this material is thin, it will not clog the screen slide in any way.—J. K. Cooper.

Finishing Golf Tees

Referring to John Duncan's inquiry under the above title, page 77, January issue, I believe that since he already has tumbling barrels and is familiar with all the ways-and-means of this method, there is no important reason for his departing from it—at least until he has found the following method of no value. I have seen other novelties finished in a similiar manner and believe it can be made to work with golf tees.

Tumble these tees with grated wax of the required color. This involves no new equipment, although some experimental work in the matter of speeds and loading is usually necessary with every new tumbling job.

A splendid, hard, waterproof finish can be imparted with vegetable wax that has been shredded or grated. This wax should first be melted (it melts at about the temperature that glue is liquid, that is about 160-deg. F.) and then colored with a suitable wax stain. The mixture is poured out and, when cold, is cut up into the fine form for tumbling. The darker grades of vegetable wax are a dull green-yellow; the lighter are a light cream. Some idea of what may be done in coloring wax



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SPRA-MORE
Portable Unit

Here's the low-priced, thoroughly dependable Spray Painting Equipment that leads the field in finishing satisfaction! Sturdily built for long, hard service—free from servicing troubles! Its ¼-HP Motor and Twin-Diaphragm Compressor develops an abundance of clean, dry air pressure—without pebbling or pitting! Spray Head is instantly adjustable from fine line to full five-inch fan-shaped flow—no nozzles to change!

For an economically priced Spray Unit that has features of larger and more expensive equipment—the SPRA-MORE is far, far ahead in its class! Handles paints, lacquers, varnishes and enamels! Complete Equipment Retails for ONLY $57.00!

There's a Dealer near you—write for the SPRA-MORE Bulletin!

Crown Spray Gun Manufacturing Co.
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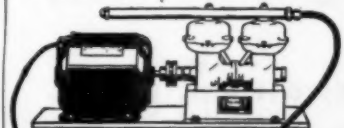

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Clamp to *any* tank and mix *all* liquids. A wide variety of sizes and types up to 50,000 gallons capacity.

MIX QUICKER

LAST LONGER

COST LESS

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The Features that insure the supremacy of "Hy-Speed" Mixers are fully covered by U. S. Patents

Write for Catalogue

ALSOP ENGINEERING CO.
47 West 63rd St., New York

may be gained from the gay appearance of candles which are now so popular; candles, however, are made of a much softer wax.—D.A.H.

Finishing Wood Slides of Window Screens

Referring to a question and answer under the above title on page 72 of December issue, if A.S.B. & Sons will first treat their slides with a coat of oil stain and follow with an application of hot paraffin, their troubles in this matter will cease.

If the slides are a separate unit, they should be dipped, otherwise, brushed.

If the grooves on the screens are coated with paint or enamel, they too may be rubbed with paraffin.—A. J. Beecher.

Reclaim Wiping Cloths

By way of comment on the article "Salvaging Part of What's Wasted," in February issue, page 53, the American Laundry Machinery Co., Norwood Station, Cincinnati, Ohio, calls attention to its "wiping-rag washing unit" for cleaning soiled wiping rags, polishing cloths, wool and cotton waste, covers, and any other fabrics used in industrial finishing operations.

Notes from literature on this subject follow:

The material to be reclaimed is first put in a small power washing-machine and washed in a solution containing soda or some similar low-priced chemical. This washing is according to a formula for the specific conditions and requirements. After being washed the material is placed in an extractor where surplus water is

removed. The final operation is at the dryer.

By this method, soiled materials can be made ready for use again in a few hours. The cleaned sterilized cloths are more sanitary for the workman, and cloths treated in this manner are softer and more absorbent than when they are obtained in their original condition.

Lacquer Nomenclature

With reference to Mr. G. O. Zeller's article in the November issue (page 26) and the Hilo Varnish Corporation's comments in the January issue (page 86), under the caption "Colored Lacquers and Colored Enamels":

In our organization, opaque pyroxylin materials are referred to as *lacquer enamels*, and either transparent or translucent pyroxylin materials, as *lacquers*.

This seems to properly correspond to the customary practice with respect to varnish materials, of calling a transparent or translucent product *varnish* and an opaque product a *varnish enamel*.

If the pyroxylin lacquer has a color introduced through the medium of an aniline dye, giving a colored translucent film, let us say it is *red* for instance; the term *red lacquer* is used. In the case of a red pigmented lacquer, the term *red lacquer enamel* is used.

Just as the word "varnish" indicates a clear solution, we use the word "lacquer" in the same sense. Therefore, the terms *hardware lacquer, metal lacquer, wood lacquer, furniture lacquer*, etc., all indicate *clear transparent pyroxylin solutions*.

Of course, matters are somewhat simplified where, as in our case, a trade name is used to in-

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Common Sense Strainers

Made of heavy manila paper, with a fine cloth set in for straining. Six inches in diameter and five inches deep. Made in two meshes, fine and medium.

	Per 100	Per Doz.
Fine Mesh	$2.25	$0.35
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Prices are Net F. O. B. Chicago.

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"The Paint People"
164 W. Lake Street Chicago, Ill.

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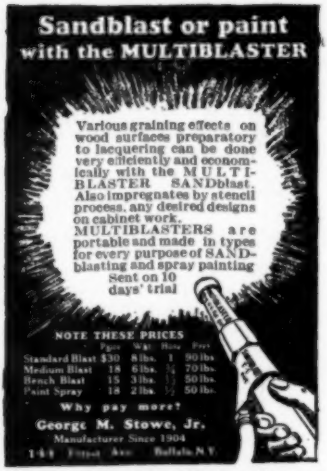
Sandblast or paint
with the MULTIBLASTER
Various graining effects on wood surfaces preparatory to lacquering can be done very efficiently and economically with the MULTIBLASTER SANDblast. Also impregnates by stencil process, any desired designs on cabinet work.
MULTIBLASTERS are portable and made in types for every purpose of SANDblasting and spray painting
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Paint Spray 18 2 lbs. ½ 50 lbs.
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HOOSIER PAINT WORKS
FORT WAYNE, IND.

dicate that a pyroxylin product is meant, to wit:

Mimax handle lacquer.....clear
Mimax red handle lacquer.translucent
Mimax red handle enamel....opaque
—Pittsburgh Plate Glass Co.

Fire Precautions

Management in practically all industrial plants throughout the country is taking every precaution to prevent or reduce the hazard of fire, and many are the methods adopted to meet this menace. Sometime ago it was my privilege to visit several large industrial establishments and I was impressed by the methods employed to prevent the starting and spreading of a fire. First of all I noticed that all of these plants were equipped with automatic sprinklers.

In one plant modern fire extinguishers (metal containers filled with fire extinguisher material in powder form) hang in plain sight on posts and walls. This material is used by throwing it forcibly into the base of the flames by handfuls; its purpose is to smother the fire. This fire extinguisher powder is effective when the fire is still small—and practically all fires are small at the beginning. Also there was placed about the interior of this plant at various places connected coils of hose ready to be used instantly.

In another plant I noticed throughout the buildings, small tanks of 2½-gallons capacity, containing a chemical fluid with small hose attachment. This is simple and handy to use when needed. In case of fire a man lifts the tank from its hanger, directs the hose toward the blaze and turns the tank upside down. This releases chemical fluid to play upon the fire. In the finish-

ing department one of these tanks is located near each spray booth, and the spray operators know how to use extinguishers of this type.

This firm also has a large chemical apparatus which includes a 25-gal. portable tank with hose attachment. This outfit can be wheeled to wherever it is needed and certain workmen have been properly instructed as to how to use it.

Some firms choose from among their employes a number of men who are organized as the plant's fire department. These men are given complete fire-fighting equipment and at intervals are called to fire drills so as to become as proficient as possible to battle a fire when necessary.—John H. Hamilton.

Heavy Bodied Clear Wood Lacquers

A material difference of appearance can be readily seen in wood surfaces finished with the new improved "heavy-body" industrial wood lacquers, as compared to surfaces finished with the old style thin lacquers because the heavy-body lacquer has the building-up properties comparable to a varnish and, in a full coat application, it flows nicely to a full-bodied finish.

It is particularly adaptable to mahogany, as it gives added depth of finish to this surface.

I will venture the assertion that there is complete agreement among the interior wood finishers, who use this improved material, especially among the boys on the rubbing deck, since this heavy film lacquer can be rubbed easier and quicker—and the rubbing oil does not cloud, or sweat back, as it will do on some thin-bodied lac-

new!

Economy Deluxe Sprayer

For the user of industrial spray equipment this new *Economy DeLuxe Sprayer* gives better application of any paint, varnish or lacquer. Combines high efficiency, simple operation and puts new life in the paint shop. Light in weight, does not clog, easily cleaned. There are many good reasons for the present popularity of Economy Spray Products PRICED: *DeLuxe Spray Gun—with material tube, cover, container, 25 feet air hose and connections and agitator . . . $32.00. Above without agitator . . . $30.00. DeLuxe Gun without any of above accessories . . . $22.00. 25 feet air hose with connections . . $4.50. 1 quart metal container without cover . . . $2.50.*

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quers. This gives a more pleasing and uniform appearance to the surface.

A satisfactory film can always be produced with two coats of this material, which needs no reducing, whereas three or more coats of the old style lacquers are required.

It is also worthy of note that this material can be sprayed as it comes from the drum, thereby eliminating the thinning or reducing problems, plus orange peel effects. This also seems to have been taken into consideration by the manufacturer, when formulating this lacquer.

In my opinion it will cause less trouble and will produce better results than any previous lacquers for interior wood finishing.

Then there is this fact also: that it does give a better and more rapid finish with less handling of the work at the spray booth, on the same schedule—a very decided improvement in lacquer finishes.—Edward C. H. Rottmann.

Not so long ago, the extreme in color combinations for a motor car was represented by a black body with red wheels. "Just a little sporty" was the comment of more conservative men when they saw such a car. But today! Color combinations are the rule although they are more subtle than red and black.

Artists have always gone to Nature to secure their color combinations. The gradations of tones in a rose, the striking contrasts in a flaming bed of tulips, the infinite tints and shades in the feathers of a peacock—all have provided the artistic eye with new color combinations.

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Write for Bulletin No. 7 — Hilo Standard Colors

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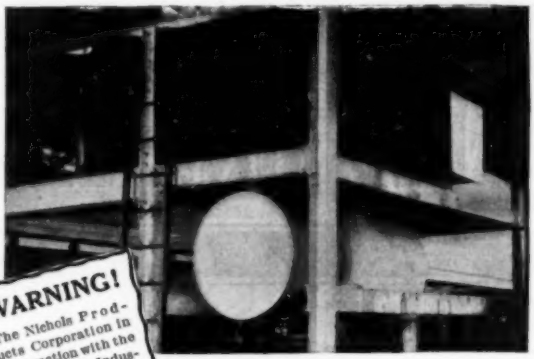

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Continuous Oven Aids Japanning

Describing the bake-finishing operations performed by a continuous japanning oven which is used in finishing metal parts in the Oliver division of the Pyle National Co., of Chicago

By I. G. C.

THE following notes and data were taken from the actual operation of a continuous japanning oven located in the Oliver division of the Pyle National Co. of Chicago. The oven referred to is used to japan parts for railroad-signal and train-control equipment.

The oven comprises a 4x10-ft. chamber for loading and dipping 11-ft. high, and a 6x15-ft. section for baking and cooling 12-ft. high. The latter has a floor 3-ft. above the outside floor level, the lower section acting as the cooling chamber. Oven walls are of double steel sheets with four inches of asbestos between. The insulation is so perfect that the drop in oven temperature an hour after the burners and exhaust fan have been shut down is only 90 degrees.

Continuous Chain Conveyors

Parts pass through on a continuous chain conveyor 36-in. wide, with cross bars 26-in. apart on which parts are hung by means of wire hooks. The conveyor passes an opening at the feed end for loading, then downward nearly to the surface of a dip tank or trough, upward over a baffle wall separating dipping chamber from oven, through the oven, down to the cooling chamber and through to the feed end.

Sprockets in the oven are so placed that the conveyor forms loops to increase the period under heat. A 1-h.p. motor drives the conveyor through a spur gear reducer and a variable speed transmission. The main drive sprocket is connected through shear pins so that the stoppage of the conveyor cannot cause serious breakage.

Japan is placed in a trough shaped tank. At the slow speed of the conveyor most of the excess japan drips off the parts onto a sloping drip plate and thence back to the tank.

Oven Heat

Four atmospheric gas burners using gas at a line pressure of 6-in. water column are spaced about 24-in. apart at the bottom of the oven. Each is inclosed in a metal chamber 5-in. wide and 10-in. deep, extending across the oven and entering vertical ducts along the side walls which carry gases of combustion to the top of the oven chamber. The flame heats the oven through walls of the burner chambers and ducts, the gases of combustion entering the oven at considerably reduced temperature.

An automatic temperature control device holds any desired temperature and is set for 425-deg. F. A recording thermometer gives a permanent record of heat. A small induced draft fan driven by a ½-h.p. motor is so located as to remove japan fumes and gases of combustion from the oven.

The pieces japanned vary so widely in shape, size and weight that no enumeration is possible. Three typical parts of which large quantities are run are iron receptacle covers or caps, iron junction boxes and aluminum classification lamps. These weigh 5-oz., 3-lbs. and 4½-lbs., respectively.

Cycle of Operations

All parts are brought to the oven from the shops in small wheeled boxes from which the operator hangs them on the conveyor bars by means of small wire hooks. Under normal operation one part is hung on a hook, but when it is necessary to force production, multiple hooks, holding as many as 25 pieces, are used.

Parts require about 1¾ hours to complete the circuit from the time they are hung on the conveyor until removed by the same operator. In rush periods the cycle has been reduced to 1¼ hours. Upon removal the parts are placed in boxes for transmittal to tapping machines. It is necessary to tap the pieces after japanning, as otherwise the threads would become clogged with japan, requiring additional tapping. An exception is made in the case of junction boxes, which are tapped first and their tops screwed on before going through the oven.

All parts are given one coat, the thickness and degree of hardness being determined by the character of bath and time of baking.

Burners are in operation ten hours daily, being lit at 1 A. M. and bringing the oven up from 70 to 425-deg. F. by about 8.30, thus permitting 8 hours of actual japanning. During a half-hour period at noon no parts are fed to the oven, the burners serving merely to keep the oven up to heat.

Maintenance

The operator cleans and greases the machine on Saturday or Sunday, spending 30 minutes for complete greasing and two hours for cleaning and renewing the japan supply. Due to exposure to heat, lubrication of the conveyor chain is accomplished by a special oil for this type of work. Houghton's No. 3 conveyor oil, which is applied by brush, is giving very satisfactory results. Gas burners with their automatic control relieve the operator of all attention other than lighting in the morning and turning off at night.

Gas Consumption

Heating up requires 900-cu. ft. at a rate of 600-cu. ft. per hour. A full charge is always in the oven. While loading at an average rate of 350-lb. per hour the gas consumption is 510-cu.ft. per hour. During the noon shutdown the consumption is 220-cu.ft. to hold full temperature, or at the rate of 440-cu.ft. per hour.

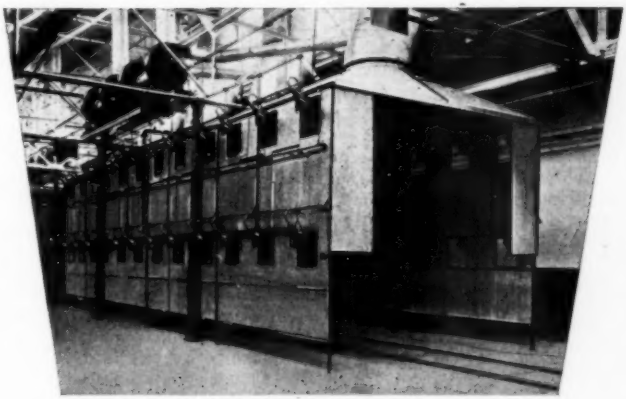
At the present schedule of production the average daily consumption is 5200-cu.ft.

Weights vary greatly and bear no relation to the capacity of the oven, which depends on the size, shape and consequent number of parts which may be hung from one conveyor bar.

Freedom from fumes due to effective exhaust and absence of dirt or oil around the oven have made japanning a very clean operation.

Close automatic control has held an absolutely level temperature, the recording instrument charts showing no visible variation from regulator setting. Thus the quality of work is uniform under all conditions of loading.

Operating Efficiency with Fire Safety



Mahon Spray Booth Specialists, pioneers in the scientific development of Spray Booths for every industry, have perfected Spray Booths and Exhaust Stacks co-ordinated to produce maximum operating efficiency with fire safety. Mahon Evase type, syphon Exhaust Stacks are so designed that exhaust fumes never come in contact with the fan or motor—a feature eliminating the possibility of fire from motor sparks or friction. Mahon Spray Booths are designed in close co-operation with manufacturers in order that the best possible arrangement may be obtained to meet individual requirements. Let Mahon engineers work with you in the solution of your Spray Booth problems. Consultation with these experts will not place you under any obligation. Write for literature.

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Japanning Costs

Operating costs on the oven equipment, with unit costs per 100 lb. of mixed output, have been obtained. Fixed costs are based on a 20-year life, which is considered fair in view of the fact that less than five productive hours have been lost in two years of service. An allowance of $175 per year is made for lubrication, cleaning, maintenance and repairs. The total annual charges amount to $541.75, or $1.81 a day.

Other daily operating costs are for labor, power, japan and gas, and are set up in two columns for maximum and average output. Only the last two items are variable. Japan cost is taken at the average consumption of 4 gallons a day, and gas is charged at the measured rates of consumption.

The totals are $14.42 and $14.36 for maximum and average outputs. Unit costs are $0.428 per 100-lbs. at maximum output and $0.502 at average output.

Actual maximum output of the oven cannot be determined under present operating conditions, but probably exceeds the figure given, reducing the unit cost proportionately.—Industrial Gas.

Finishing Agricultural Implements

In the painting of agricultural implements the old arrangement included priming one day, second-coating the next, and striping and varnishing the third day. The work was all air-dried. Today this industry is using improved materials, dipping equipment, continuous-moving conveyors and the tunnel system of forced drying. The new system has greatly speeded up and increased production, with much more than a commensurate reduction in cost.

Some of the work goes out in two coats only, as for instance the parts of mowing machines. The one color coat of flat paint, which is dipped, is baked in 30 minutes while passing through the first tunnel; the mower is then cooled for ten minutes by air-blast, striped and dipped in varnish. Then it passes through the second tunnel from which it emerges at the end of one hour, completely finished. The total time is two hours from start to finish, as against the previous method which required three days.

The baking process, at the harvester works I have in mind, has proved to be a wonderful success. On one color alone—the blue enamel—the time of painting or finishing was reduced from 48 to 4 hours, and a great saving occurred in floor space and in the number of trucks used. Formerly 348 trucks were required to handle the production, and now only 88 trucks are used. Previously three large rooms were crowded with the dipped pieces, and now only one room is needed for them.—E. Perry.

Even the casual observer can hardly fail to note what an important effect color has on the sale of automobiles today. Everywhere color—yet more color—always an increasing and insistent demand for new and pleasing color combinations.

George Belcher Writes:

I have a modern well-equipped Industrial Finishing Shop, including a sandblaster for cleaning metal products.
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Heat too, is a kangaroo . . . always ready to jump from its baking job . . . and requiring no particular urging to do so.

That is why, in the design of Swartwout Metal Insulated Ovens, special care has been taken to reduce heat loss possibilities. That is the reason for the Swartwout Stop-Gap Joint . . . a revolutionary improvement which puts maximum insulation where heat transmission is usually most evident.

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Heat cannot jump the Swartwout Stop-Gap Joint

"A finishing system that includes no lacquer materials."

PRIMERS, FILLERS, ENAMELS FOR METAL FINISHING

Revealing, in a general way, the ingredients of typical primers, fillers, surfacers, putties and enamels, of non-lacquer content, which may be brushed or sprayed, air dried or force dried

By E. Perry

IT IS often valuable for the finisher to know what ingredients are included in the materials he works with, since from this more comprehensive information he may be able to turn out better work, and do it more economically.

Formulas vary, of course, but as a rule the finisher is concerned only with the general contents and preparation of his materials, provided satisfactory results are being obtained. It is with the idea of informing finishers in a general way what some of their materials contain, that the following data are submitted.

Explanation of Materials

Note: It shall first be explained that the materials under discussion in this article are of paint character and not lacquer type; and it will be readily apparent to some finishers that the process of bringing up a finish, in this system, is very much akin to the old carriage or coach painting methods—except in its more limited number of coats and operations, and also the further advantages that it can be applied by spraying as well as brushing, or can be baked or force-dried if the production schedule demands more speed than air-drying permits—and the materials are adapted to wood and metal surfaces.

It is claimed that under certain conditions some work can be completed almost as quickly as with lacquer, perhaps more economically, and that the finish possesses great durability. Whereas lacquer is not successfully suited to every type of surface foundation, this other material of paint character, applied to composite structures, is safely adherent and elastic.

In brief, for the better jobs and for either air-dry or force-dry work, it is not more than a five-coat job, and only six-coat work if a higher luster is desired by flowing on a coat of clear finishing varnish.

Typical Varnish Enamel

One gallon of typical enamel consists of seven pints of specially-constructed varnish, pigmented with about 4½-lbs. of zinc oxide, ½-lb. of white lead and 1-lb. of heavy calcite whiting. The pigments are finely ground into the varnish. The varnish is composed of kettle-bodied heavy linseed oil, hard varnish gums, and turpentine. This varnish is of chief importance from the standpoint of durability against weathering.

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OAKITE
Industrial Cleaning Materials and Methods

The Priming Material

The primer coat is always important as a part of the finishing system; it must possess extremely good adhesive properties to cling tenaciously to the surface being covered, and it must have an affinity for the surfacing coats.

For metal surfaces the primer may be made up in the proportion of one gallon of enamel "lengthened" or made more elastic by addition of 1/16 gallon (½ pint) of heavy litho. oil—also termed lithographer's varnish. For priming on wood, the half pint of viscous oil is added to only 15/16 of a gallon of enamel, or even slightly more oil; in some cases a further addition of a very small amount of turpentine is used according to the judgment of the foreman finisher.

Filler or Surfacer

The usual filler or surfacer for an enamel job has a varnish vehicle very much like the enamel varnish; it carries a preponderance of pigment, this making it particularly efficient for filling and likewise strong in hiding power, so that only two coats are required for most jobs, and never more than three coats for any class of work. Applied by a good spray operator, it can be put on in heavy but uniformly-thick coats, without liability of runs or sags; or the workman can spray lightly and follow up soon afterward with additional coats until the desired thickness is obtained.

Putty for Depressions

Putty for filling in deep depressions can be any high-grade glaz-

ing putty. The usual putty employed in this process consists approximately of the following ingredients:

Zinc oxide	(parts by wt.)	1
White lead	(parts by wt.)	2
Soapstone talc	(parts by wt.)	2
Keystone filler	(parts by wt.)	3

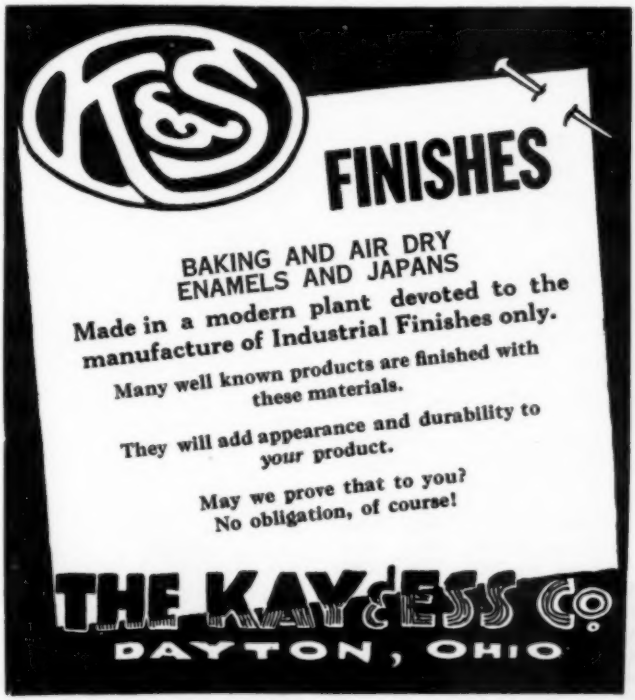
The "keystone filler" is a natural siliceous mineral similar to what many finishers know as Reno's umber filler. It is ground to the desired knifing consistency, in a vehicle which might be described as four parts (by volume) of a "lightening" gum japan and one part of lithographer's oil.

Material of this type is on the market as a general utility paste for the smaller automobile refinishing shops. Besides being used for puttying, it is adaptable as a sanding surfacer when thinned with turpentine to the consistency of coach color, and as a primer by the addition of finishing varnish with a little turpentine.

The Colors Used

The foregoing description pertains to all shades made with white base, but colors also can be made by properly balanced pigmentation. In such cases—wherein the color does not permit ad-

(Continued on page 129)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Subscription rates, $1.00 per year in U. S. and possessions; $1.50 per year in Canada and $2.00 per year in foreign countries.

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EDITORIAL

A New National Merchandising Exposition

The first national merchandising exposition in the history of the U. S.—described officially as the "American Fair" will be held this year from August 3rd to 25th inclusive, in the new Atlantic City Auditorium, the largest building of its kind in the world. The object of the American Fair, which will be held annually, is to provide manufacturers with a new medium for promotional and merchandising activities. It will be an exhibit of nationally-known American products.

The fair will employ the media of exposition, radio, spectacular entertainment and publicity in a new combination of those elements in providing approach for participating business interests to the attention of the country. All the resources of Atlantic City, Mayor Ruffu of the famous summer resort announced, are at the command of the project. Its general conduct, he said, is in the hands of a company constituted for that purpose, the American Fair Corporation, with offices in New York.

The new Atlantic City Auditorium, where the Fair will be housed, has just been completed at a cost of $13,000,000. Seating capacity on the principal floor alone is 41,000. The main exposition floor is of some 2½ acres in extent, with a ceiling 130-ft. above. It contains the world's largest stage. The 1929 Fair will mark the opening of the Auditorium to its first event of national commercial scope.

The American Fair is a new medium for both those products sold for commercial and industrial use and for general consumption. It is a natural response to the growing recognition of the national merchandisers' need for more direct contact with the buying public.

Variety of Decorative Effects

Today there is available and in use an immense variety of decorative effects applicable to factory made products, and there is a variety of materials, equipment and methods employed to produce them economically. For example, some of the more familiar finish decorations include: antiquing, bronzing, crackle and crystallizing finish, decalcomania decoration, gilding, graining as in printing attractive wood or marble grain on plain surfaces, hand painting, high-lighting, inlay in real or imitation, marbleizing, matched veneers arranged in geometric designs and finished natural, mottling, polychroming, spatter-

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One of the important advantages of PENT-ACETATE as a lacquer solvent lies in the ideal balance of properties that make it so valuable in the elimination of "blush" —particularly in hot weather. PENT - ACETATE (pure Amyl Acetate) permits of a slow evaporation that is fast enough to leave the film in just the right time to eliminate summer lacquer troubles. PENT - ACETATE is, indeed, the ideally balanced lacquer solvent for all weather and plant conditions.

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ing, stenciling, stippling and striping. Color is more or less of an important factor in all of these decorative effects; in many of them, it is everything.

The imitation and reproduction of certain outstanding beauty of Nature's attractive handiwork is prevalent in industrial finishing, and this work has reached a high degree of development. In fact, the materials, equipment and methods available for the production of any of this decorative finishing are so effective and economical that it can be successfully applied to articles and products priced to sell in large volume.

The problem today is how to use decoration effectively, skillfully and artistically—how to use it with a purpose so it will command enduring admiration rather than just strike a passing fancy or perhaps arrest attention for only a moment by some element of novelty, uniqueness or perhaps freakishness. This is a problem for the decorative designer or artist.

Practical Problems Solved

In these rapidly changing times every finisher foreman is almost sure to be confronted sooner or later with the problem of finishing a surface or material that is new or strange to him. Often he will be obliged to work out a system of finishing peculiar to the nature of that strange surface.

One finisher's account of how he solved such a problem appears in this issue of INDUSTRIAL FINISHING. Naturally, in making up his first test panels, our finisher friend began to use the well-known materials and methods ordinarily employed on a familiar kind of wood which seemed to be similar in characteristics to the stranger. To his surprise, the results were anything but satisfactory. Wisely, he decided to "forget all about" the familiar wood and concentrate on how to finish the wood that was new to him. After some careful experimenting and observation he developed a finishing system exactly suited to the peculiarities of the strange wood, and he produced a most beautiful and attractive finishing job on a complete set of interior fixtures.

A finishing foreman must be not only well informed—he must be constantly alert with determination and initiative to cope successfully with new conditions and new problems. Every month, INDUSTRIAL FINISHING furnishes an immense amount of technical and practical information of value along this line; also in the vigorous original writings of live-wire finisher foremen and superintendents, there are numerous ideas and suggestions that tend to stimulate progressive thought and action.

Improved Air Conditions Improve Finishers' Health

Industry—highly organized for mass or quantity production—has found that it pays to protect the health of the worker by giving him plenty of light and clean air, and by removing the causes which formerly were a menace to his physical well-being, and which made accident easy.

In many of the manufacturing processes of America's basic industries, dangerous gases, fumes and dust are created but, through the adoption of modern methods of controlled ventilation and air conditioning, are mechanically collected and carried away. In the old days these poisons were allowed to harass the worker and sow the beginnings of tuberculosis, painter's colic and other scourges. They were the condi-

tions, too, which permitted destructive explosions of gases or dusts, or were the origin of death-dealing fires.

With the announcement recently that some of the largest insurance companies are taking a new interest in air and other health conditions in industrial plants where thousands are employed, there are further reasons for encouragement. It is an actual fact, for example, that insurance companies have reduced fire and accident rates on plants where the risks have been lessened by provisions for air conditioning, not only for ventilation but for the prevention of explosions and fires. The insurance companies are very materially interested in the public health and mortality figures.

Much money has been spent and is being spent for equipment in an endeavor to better working conditions. More than ever before executives are realizing that better light and better air are factors in production. We breathe through the pores of the skin as well as through the nose and, therefore, air temperature and humidity become factors in production. The comfort of the worker depends on these factors. Thermometers in the work room should be used to gauge results. We are all agreed that man-power is the big essential element of production. We must take as good care of our workers as we do of our machines, if our factory is complete and yields dividends.

Primers, Fillers, Enamels for Metal Finishing

(Continued from page 125)

mixture of the inert ingredients essential to proper filling and surfacing—it becomes necessary to apply rubbing coats over the filler.

The primer and putty can be any color or shade, but should be different than the filler, so as to serve as a guide coat when surfacing down the filler. The filler should match the enamel as closely as possible; otherwise, oversanding of the enamel is liable to cause a blotchy appearance in the finished job, due to reflection of the filler through the thinned coating of enamel.

CLASSIFIED ADVERTISING

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

WANTED

A man experienced in the finishing of furniture of all grades for position as service man, representing large company out of Cincinnati. Address all communications to IF-249, care Industrial Finishing.

SUPERINTENDENT WANTED

For small grinding department, experienced in furniture enamels and industrial finishes. Department consists of superintendent and one helper. Advise experience, who we should ask for recommendation and salary required. Our plant is located in the Ohio valley. Address IF-242, care Industrial Finishing.

FOREMAN FINISHER

Desires change. 16 years' experience at wood finishing. Can mix colors, get production and handle men. Eastern location desired. Address IF-253, care Industrial Finishing.

EXPERIENCED LACQUER SALESMAN

I have had over 15 years' experience in selling lacquers to Industrial Trade in the East and Middle West. Have been the sales manager for two representative companies. Am open for a new connection. Address IF-252, care Industrial Finishing.

FOREMAN FINISHER

Desires position. Up-to-date in latest methods of finishing. Sixteen years' experience in bed room and dining room furniture. Can handle men and keep production up to schedules. Have good reference. Address IF-251, care Industrial Finishing.

EXPERIENCED FINISHER WANTED

Who is ambitious to become a salesman. A man who has not only the practical knowledge to intelligently advise with his prospective customers, but the necessary bearing in sales approach. We would like to have a man who is now working in a furniture factory in North Carolina or Virginia. Applicant must state age, education and initial salary desired. Address IF-250, care Industrial Finishing.

SALESMEN OR JOBBERS WANTED

To cover territories in the following states or furniture centers, to sell a real Shellac Substitute on a straight commission basis: Rockford, Ill., Evansville, Ind., High Point, N. C., Gardner, Mass., Sheboygan, Wis., Shelbyville, Ind., Philadelphia, Pa., Cleveland, Ohio. Address IF-248, care Industrial Finishing.

FINISHER—NOW AVAILABLE

For 16 years with one of the largest woodworking establishments in the country; for several years in charge of very large finishing department. Thoroly acquainted with both varnish and lacquer. Any location in Middle West considered. Details gladly furnished. Address IF-246, care Industrial Finishing.

SALESMAN FOR INDIANA

Wanted; a high-class salesman and demonstrator who is well acquainted with the furniture factories in Middle West, especially Indiana and who can sell Varnishes, Lacquers and Enamels made by an old well-known manufacturer with established trade in this territory. This is a good position for a real salesman who is willing to work. Write giving experience, references, etc. Answers will be held in strict confidence. MAYER & LOWENSTEIN, Long Island City, N. Y.

INDUSTRIAL SALESMAN WANTED

For southern New England and eastern New York state, large well-established manufacturer has an opening for a good industrial salesman. Full line Industrials, including Lacquer, Varnishes and Enamel upkeep. Unusual opportunity. Address IF-245, care Industrial Finishing.

DEMONSTRATOR WANTED

Metal furniture finisher for demonstration work. Nationally recognized manufacturer of industrial finishes.

Must have broad experience with lacquers and baked finishes, including graining. Considerable travel, principally in eastern states required. Write full details of experience to IF-247, care Industrial Finishing.

THE COLUMBUS VARNISH CO.
COLUMBUS, OHIO

Specialize in Industrial Finishes

VARNISHES
LACQUERS
SHELLACS
ENAMELS
2 COAT DAILY FINISHES
LACQUER ENAMELS
STEEL OR WOOD FINISHES
BAKING FINISHES